THE ART OF WARRE,

OR

Militarie discourses

¶ *Of leavying, marching, encamping; and embattailing an armie.*

¶ *Of building, defending, and expugning forts and fortified cities.*

¶ *Of ordinance, petards, and fireworks.*

¶ *Of the severall duties of officers, and souldiers.*

¶ *Of the Grecian, and Romane* Militia, *and forming of battaillons*; &c.

BY

The Lord of PRAISSAC.

Englished by I. C.

(Capt.) Jos. Co

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This translation (intituled The Art of Warre, or Militarie discourses by the Lord of Praissac*) may be imprinted.*

ARUNDEL *and* SURREY.

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Vpon the accurate tranſlation of the Lord *Du Praiſſac* his Militarie diſcourſes, done by his eſteemed friend Captain JOHN CRUSO.

TImes have their Genii: *yea; and Places too.*
For contemplation ſome are; ſome to do.
That Laurell, which ha's crown'd Aſtræa's head,
May to Bellona's *front be altered.*
Arts have their times too. In that ſeaſon ſing
The Muſes nine about their dancing ſpring:
Another while much fitter Muſick are
Thoſe ſterner arts, that teach us how to warre:
(Happie that age, that can ſo much foreſee,
To ſtudy warre in her tranquillitie.)
That Amazonian offſpring, which doth ſit
Near Pallas *ſtrength, and near* Minerva's *wit.*
Theſe teach the needfull uſe of Armes to know;
To march by their field-muſick quick, or ſlow;
To ſit down 'fore a town; T'encamp in field;
How to embattail; And how forts to build;
T'aſſault; defend; To famine; force; ſurprize;
How to releeve beſieg'd; void treacheries;
And (that which makes commanders worths grow high)
How ſtratagems to make; and how t'apply:

Of these the Lord Praisfac *the skill hath shown:*
(So Greatnesse by her vertues best is known)
To fortifie; To make a Canonier;
To contrive fireworks are directed here;
And, lest th'unpractick officer of a Band
Should know his title, but not understand
His place, and dutie, he hath tane some pain
To teach. 'Twere hard, his labour should prove vain;
And most industrious Cruso *loose his end,*
That to the state did so much oyl intend.
He, that hath but the language, boldly may
Seek to translate, yet is but half the way.
Who renders Sence for Sence, and Words of Art
Does properly expound, does act the Part.
Praisfac *is well-come into England. We*
May joy in him; But yeeld our thanks to Thee.

W. Denny Esq. Serg. Ma.

To his very worthie friend Captain John Cruso.

Could I command an Armie forth, & train
Inventions Forces, had I a Martiall vein:
I would lay siege to Censure, and surprise
The strongest Fortresse Envie could devise
To raise against thee, *Momus* force to yeeld,
And leave thy judgement Master of the field.

Hadst

Hadſt thou vouchſafed onely to impart
The *Centaures* skill, and the *Theſſalian* Art;
Had I but known thee in thy Cavallrie
What dim-ey'd *Aelian* ſpi'd not to deſcrie,
And, where *Walhauſen* faild, to bring to light
What *Baſta* wanted and the* *Malta* Knight; *Luys Melzo.*
An oath had gone for't, *Cruſo* to beget
Mars with *Minerva* inceſt did commit.
But when I further ſee the Infantrie
Commanded by thee, and th' Artillerie;
Pike, halbert, partizan, musket, carbine,
The faulcon, minion, canon, culverine;
Forts rais'd, by ſiege cities environed,
Encamped Armies, and embattailed:
Me thinks that God of warre which heretofore
(How e're Great Greece and Rome did him adore)
But an Apprentice was, at length by thee
Is Maſter of his trade, and now made free,
Nor is't ſufficient to ſet *Praiſſac's* name
Before thy book as authour to the fame.
I know thou can'ſt not like a cipher be,
Unleſſe anothers worth to decuply.
And this thou haſt done. For it will be ſaid,
'Twas *writ* by *Praiſſac*, but by *Cruſo made*.
Nay, Poets Prophets are. In time to come
They'l ſay, Thou ſtol'ſt *France's Palladium*.
Till then I'le ſtile thee (and not think I erre)
The warlike *Hermes*, *Mars's* Interpreter.

Ri. Watſon Col. Gon. & Cai. ſoc.

Ad

Ad dignissimum virum & de re militari optimè meritum *Johannem Cruso*, hujus operis *Interpretem*, factâ primùm ad *Galliam* Apostrophe.

GAllia, *quid nostras armato milite comples*
Oras, belligeri prodiga terra Dei?
Non ità dividuam concors alit Anglia *pacem,*
Non est, ut vires ambiat illa tuas.
Non ita de proprio diffidit Marte, *triumphat*
Unica præsidiis imperiosa suis.
Vestra vel adversas si vis juvet invida partes,
Sentiet emeritam lis rediviva manum.
Interea non culpo tuos Crusoe *labores:*
Id dubito, ars major sit tua sive fides.
Illa, vel extremi recoletur limite mundi,
Hæc intrà patriæ limina nota tua.
Quæ, cum per multos tranquilla quieverit annos,
Sera capit Scoticæ *pignora perfidiæ.*
At ne fortè manu infelici agitata rebelli
Concidat, externa militis addis opem.
Quin age, si qua latet Germano *sanguine parta*
Ars, sit & huc genii flumine ducta tui.
Imò & ab Hispanis *referat tua dextera bellis,*
Militiæ jactant quæ bene gesta suæ.
Sic olim, Angliacâ *meritos referente triumphos,*
Singula gens proprio Marte *vel* Arte *cadat.*

Guil. Sigiswicke soc. Caio-Gon.

TO THE RIGHT HONOURABLE HENRIE Lord MATRAVERS, Lord Lieutenant of his Majesties forces in Norfolk and Norwich.

RIGHT HONOURABLE,

IT was the opinion of *Cato, Vel otii nostri reddendam esse rationem*; In conformitie whereunto I have lately spent some idle houres in bringing noble *du Praissac* to speak English. An excellent principall, as your Lordship (who are no stranger to the forrain tongues) will doubtlesse judge it, though but meanly coppied. Such as it is your Lordships many and continued favours, do embolden me (in all humble submission) to present it to your Lordship, and with it the bounden and dutifull service of

your Honours

devoted and obliged servant

JO. CRUSO.

TO THE GENTLEMEN OF the *Artillerie* and *Militarie companies* in this kingdome, and particularly of that in *Norwich*.

GENTLEMEN,

I Here present you with the excellencies of the Lord of Prailiac, *together with mine own imperfections. For the exercising of a* Companie *in their* postures *and* motions, *and to dispose that (or perhaps a* regiment *) into various forms of* battalia, *as there are divers* helps *extant (besides your commendable* practice *) so doubtlesse most of you have attained to very good perfection therein: yet I assure my self, your vertuous emulations will not suffer you to stick there, but will kindle a* plus oultre *in your heroick breasts; especially when you shall here see that you have much more to do, and that a souldiers* Gammaut *goes farre beyond* E-la.

These are times of action, *and require every true hearted subject to imploy his talent for his Majesties service and the publick safety; If these my poore endeavours may afford but the least furtherance thereunto, and my good intentions receive but a courteous acceptance at your hands, I have my desires; and rest*

Your servant

I. C.

The subject of the book.

The subject of this book is the Art of Warre, which hath two parts, Preparation and action.

Preparation there must be of men, money, instruments, and victuall.

The action is performed in the field or in fortresses.

That which is performed in the field, considereth the marching, encamping, and embattailing of the armie.

And that of fortresses considereth their fabrick, guard, expugning, defence, and releef.

The generall heads have their particular dependences, being the common practices which are daily observed; as the examples, the figures, and the chapters following do shew.

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How

How a Prince is to prepare himself to make warre, to raise an armie, and the manner of marching.

CHAP. I.

A Prince being resolved to make warre (be it offensive or defensive) ought to make such provision of men, instruments, money, and victuall, as he shall know to be necessary for his enterprise.

In making his provision of men, he is to choose such as are fit for counsell, for command, and for souldierie.

For his counsels, such whose age, prudence, experience and study renders capable of such imployments.

For commanders in his armies, he is to choose men of authoritie, respect, prudence, experience, and good fortune. Each of them having made such proof of their courage, sufficiencie, and good successe in their severall charges, as it be apparently known to all men; chiefly chosing such as are born courageous, and are habituated in all the exercises of warre: as, to handle all sorts of armes, to know all manner of militarie motions, to form all sorts of battaillons, to range armies in battalia, to make them march, encamp, embattaile, to erect fortifications, to assault places of strength, and to defend them, to make the trenches, and place the batteries; briefly, that they know all the functions of warre.

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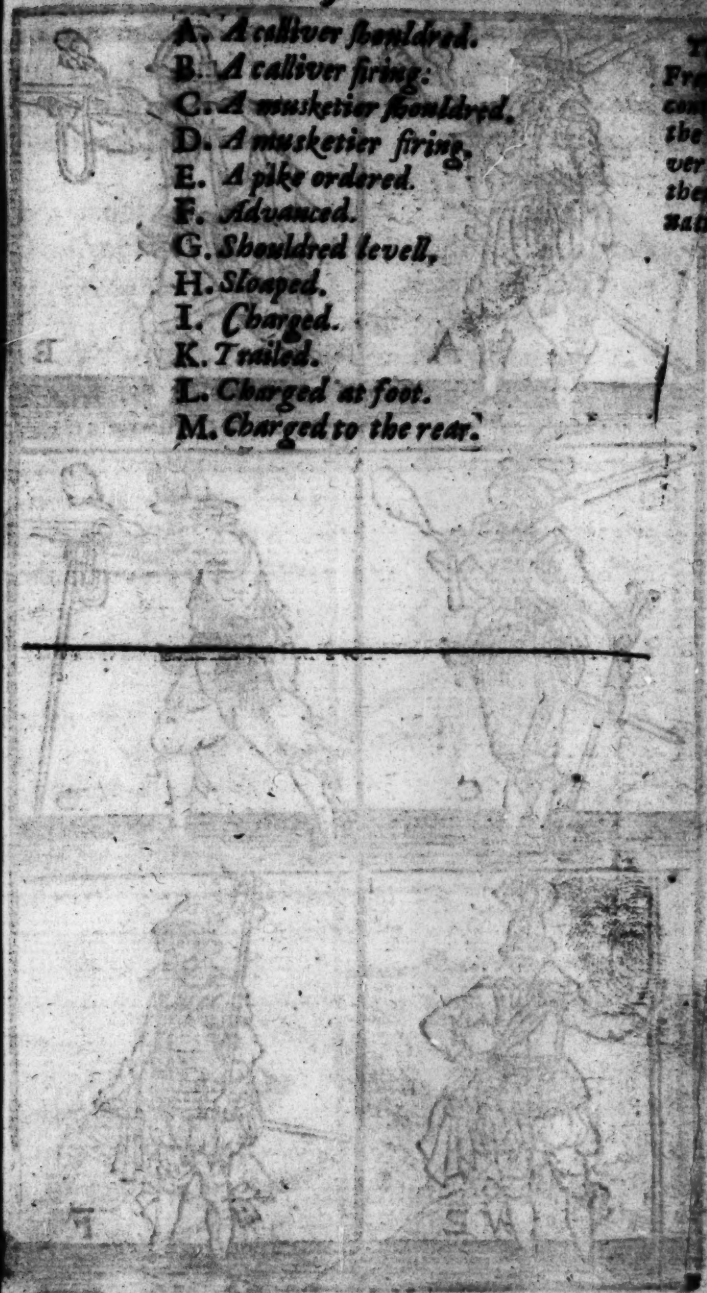
For ſouldiers (whether they be Infanterie or Cavallrie) they ought to be elected, ſuch as are ſtrong, ſtout, and of fitting yeares, giving them ſuch armes as are moſt fitting for them; and diſciplining them.

For the politick part, that they be ſober and continent in their ſuſtenance, abſtemious from play and women, modeſt in their ſpeeches, apparell, and all other actions.

Concerning the militarie part, they are to be inſtructed in the uſe and exerciſe of the ſword, musket, and pike; and to be taught how to encamp, entrench, and make their huts, how to keep themſelves in order, and to be expert in all motions requiſite for the forming and ready dividing of ſuch forms as ſhall be deſired. To this end the Captains, Lieutenants, and Enſignes ought to be very carefull to inſtruct and diſcipline their ſouldiers.

The militarie diſcipline for the foot is this; The musketiers ought to be exact in the uſe of their musket and reſt together, to ſhoulder properly, to make ready, and preſent all after one and the ſame manner, whether it be upon entring into the guard, to paſſe a muſter, or to go to the charge; To give fire, either by themſelves, by files, by ranks, or in a volly. The pikes to ſhoulder (aſloap and levell) advance, trail, charge to front and rear; And both pikes and muskets, how to wear their ſwords, how to keep their ranks and files, to take their diſtances, both for muſter and fight; To uſe their motions, to the right, left, and rear; To double, open, cloſe, and to reduce both files and ranks; to countermarch, and wheel.



A. *A calliver shouldred.*
B. *A calliver firing.*
C. *A musketier shouldred.*
D. *A musketier firing.*
E. *A pike ordered.*
F. *Advanced.*
G. *Shouldred levell.*
H. *Slouped.*
I. *Charged.*
K. *Trailed.*
L. *Charged at foot.*
M. *Charged to the rear.*

The French continued the calliver longer then other nations.

A
B
C
D
E
F

G
H
I
K
L
M

Concerning the horſe, they ought to be inſtructed how to manage their horſes and armes. Their horſes to the right and left, to advance, ſtop, retreat.

Their armes, how properly to put on and wear their defenſive ones; and to make good uſe of the offenſive, as how to charge and preſent their carbines and piſtols, and to finde out the unarmed parts with their ſwords.

A troop of horſe being to be muſtered, marcheth three in rank; but to be embattailed, it ought to be ſo diſpoſed, that for every three in rank there be one in file, ſo that a troop of 108 horſe ſhall have 18 files and 6 ranks.

The diſtance of ranks ought to be (both for the length of the horſe, as for the ſpaces between them) of ſix [a] paces, and of files one pace.

[a] *Paces here are to be understood ſteps, and not geometricall paces of 5 foot.*

To make one groſſe of many battaillons, the troops ought to be ordered into ſo many ranks as the flank of the battaillon ſhall be intended to contain horſes, and then to draw up the troops flank to flank.

The proviſion of inſtruments of warre is principally of armes and horſes; Of armes both offenſive and defenſive.

Of offenſive, as Artillerie, muskets, carbines, piſtols, pikes, halberts, partiſans, half-pikes.

Of defenſive, as head-pieces, caſques, gorgets, cuiraſſes, pouldrons, vanbraces, corſlets, taces, targets, &c. And of draught horſes in abundance for the train of the Artillerie, munitions, and victuall.

The proviſion of money is to be made by a gathering of it together long before hand in the moſt abundant meaſure that may be; by the preſerving

of it diligendy without imploying of it upon vain and unprofitable things; and by distributing of it where it shall be found necessarie; and in needfull things not to be niggardly.

The provision of victuall consisteth in the collection and duration of it, the conservation and distribution.

Having made all these preparations, and filled the magazines, there must be choice made of some citie, there to make the staple of ammition, to put the train of Artillerie in equippage, and there to take the muster of the armie, as well of the Infenterie and Cavallrie, as of the Artillerie; there also to put the armie into form of battaile, even as if they were that day to fight with the enemie.

The manner of ordering the armie for combat, is according to that which the Generall shall intend to execute; as to go and conquer a countrey, to releeve a place besieged, to give battaile, to march crosse through an enemies countrey, or to make a retreat.

If he purpose to conquer a countrey, he ought to know the estate of the same, as whether it be well peopled or not; whether he might be opposed by one or more armies, and what manner of ones; to know their alliances, and the means how to break them, or at least to hinder them from joyning together, if it be possible; to know the passages, their places of entrance and issuings out, the woods, mountains, straits, ports, keyes, bridges, havens; the situation of their cities and places of strength, their garrisons and munitions. He ought to be informed of the fertilitie of the

coun-

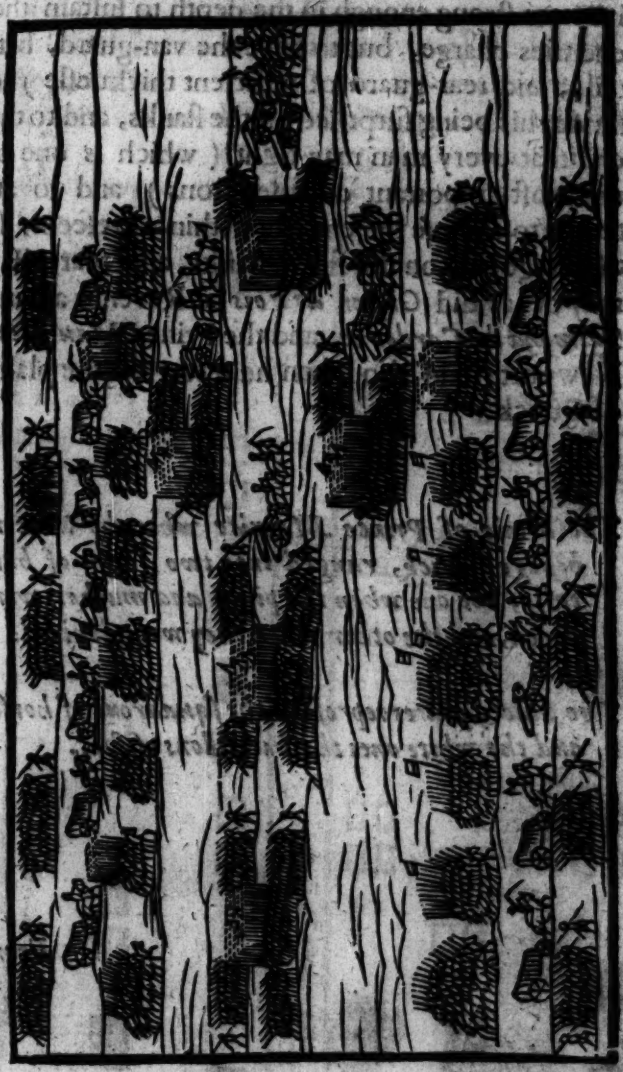
countrey, to cause victuall to be carried thither if it be barren, or to discharge his armie of that train if it abound.

He is to have the plat of the countrey in a generall map, and also in many particular ones, to know the situation and distance of places, and whether the countrey be plain and even, or the contrary, and to judge by the capacity of the place what front he may give to his armie.

If his designe be to releeve some besieged place, and to convey supplies within it, and (to effect that) desireth to force a quarter, he ought not to spread out the wings of his armie, but to keep himself serried close, as did Prince *Maurice* when he releeved Coevorden against the King of Spains army conducted by *Verdugo*; and the Marquis *Spinola*, when he went to releeve Groll.

The armie of the Marquis Spinola when he marched to releeve Groll.

Front.



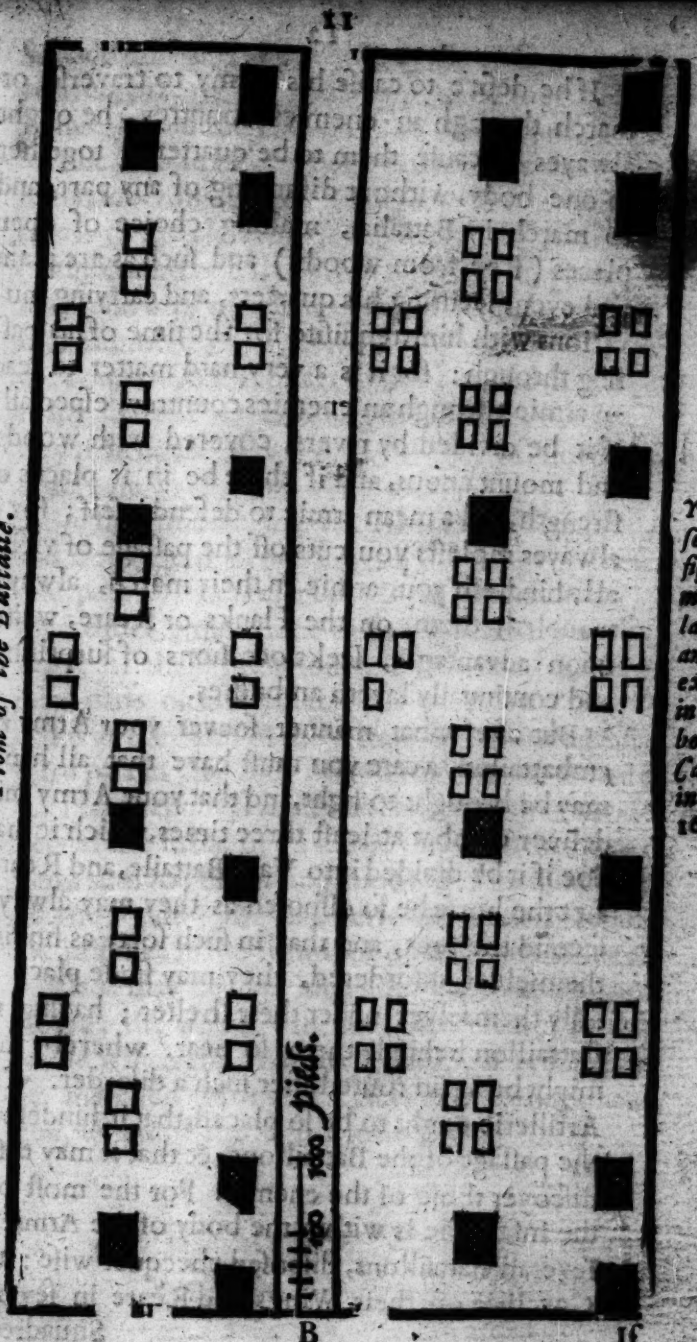
If he intend to deliver battaile to his enemie (the occasion offering it self, and the countrey being fit for it) he ought to extend the front of his armie as much as may be (yet not so much that it be not strong enough in the depth to sustain the enemies charge, but to have the van-guard, battaile, and rear-guard of sufficient thicknesse) to hinder his being surprised on the flanks, and to the end that every man may fight (which is one of the most important considerations) and to attempt to enclose the enemie within a crescent, so to charge him on the front, flanks, and rear, if it may be, as did *Gaston de Foix* at Ravenna against *Raimond de Cardonne*, and the Prince *Maurice* at Newport; and also when he traversed the plains of Gulick.

The armie of Prince Maurice when he went to besiege Gulick, ranged into two forms of battaile, the one when the pikes and muskets were joyned, and the other when they were divided.

The black squares represent the squadrons of horse, and the white ones the battaillons of foot.

Front of the Battaile.

Front



You may see this figure more largely and more exactly in my book of Cavallry, in figure 16.

If he desire to cause his Army to traverse or march through an enemies countrey, he ought alwayes to cause them to be quartered together in one body, without disuniting of any part, and to march in Battalia, making choice of open places (free from woods) and such as are plain and even, secuting his quarters, and carrying munitions with him, requisite for the time of his passing through: for it is a very hard matter to lead an armie through an enemies countrey, especially if it be divided by rivers, covered with woods, and mountainous, and if there be in it places of strength, and a mean armie to defend it self; for it alwayes molests you, cuts off the passage of victuall, hindreth your armie in their march, alwayes troubleth them on the Flanks or Reare, waites upon advantages, seeks occasions of surprising, and continually layeth ambushes.

But after what manner soever your Army be embattailed, a care you must have that all hands may be brought to fight, and that your Army may deliver combat at least three times, which it shall doe if it be divided into Van, Battaile, and Reare. Let the horse be so disposed as they may alwayes second the foot, and that in such sort, as finding themselves disordered, they may finde place to rally themselves under their shelter; having no Battaillon behinde them so near, whereby they might be again routed after such a disorder. The Artillerie ought to be so placed, that it hinder not the passage of the Battaillons, & that it may easily discover those of the enemie. For the most part the Infanterie is within the body of the Armie, in severall Battaillons, disposed checquer wise: the Cavallrie on their Wings and Reare in severall

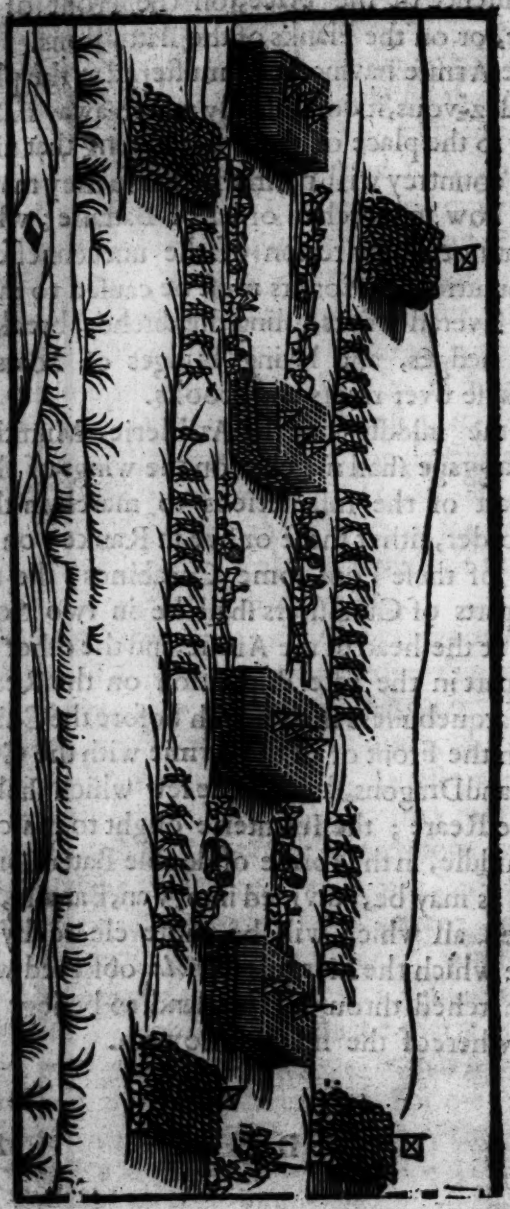
Squadrons,

Squadrons, and the Artillerie according to the convenience of the place, on the Front of the Armie, or on the Flanks of the Battaillons.

The Armie having been muſtered at the place of rendez-vous, it doth uſually march away in Battalia, to the place of their encamping that night (if the countrey will permit it) that ſo they may be taught how to march in order of Battaile; which if it cannot do by reaſon of the unevenneſſe of the countrie, the Pioners muſt be cauſed to make many ſeverall wayes, filling the ditches, breaking down hedges, and laying bridges of boats or otherwiſe over rivers and brooks.

In the middle-way the Artillerie, Munition, and Baggage ſhall march; on the wings of theſe one part of the Infanterie is to march in their long-order, either three or five in Ranke; on the Flank of theſe Foot ſome Carabines; the two third parts of Cuiraſſiers ſhall be in two Squadrons at the head of the Armie, and the other one third part in the like diſpoſition on the Reare; the Harquebuſiers ſhall march before the Cuiraſſiers in the Front of all the Armie with the Carabines and Dragons, ſaving ſome few which ſhall be on the Reare; the Infanterie ought to march in the middle, in the forme of double Battaillons as much as may be, divided into Van, Battaile, and Reare: all which will be more cleare by the forme which the Marquis *Spinola* obſerved when he marched through Freeſeland to beſiege Lingen, whereof the figure followeth.

Front.



If

If the enemie be neare to the place where the armie is to arive, the Marſhall of the Field (having choſen a fit place for the field of combat) gives order for the placing of the Artillerie, diſparteth the quarters and places of the Regiments and Munitions, cauſeth all the camp to be entrenched round about according to the art of fortification. To this end he muſt endeavour to lodge at a ſeaſonable houre, that ſo he may have time to make his retrenchments, to divide the quarters, to place the guards, to ſend out to forrage, to cauſe the huts to be made, to diſcover the actions of the enemie; and to prevent a thouſand inconveniences which the night produceth; diſpoſing all things according to the place and time.

Of encamping the Armie.

Chap. II.

AN Army is quartered in the field or in ſome village: in the field when the enemie is at hand, then muſt it be quartered in Battaillons, as if every houre there were occaſion of cambat. Alſo, the lodging in the field is when you lay any ſiege, or when the infection compells you to flee the places of ſhelter, or when the countrey is waſted and without houſes.

The quartering in villages is when the enemie is farre off, ſo as you may have time to put the Armie into form of Battaile in the place of Alarm, before he can be upon your jack.

Whether the encamping be in the field or in the villages, it muſt be commodious and aſſured. It will be commodious if there be abundance of

water, wood, forrage, and capacitie of roome convenient to lodge the whole armie, and to make the Alarme-place.

It will be assured (being in the field) by fortifying the camp round about, by causing it to be well guarded by good Corps-du-guards, and Sentinels within, and Sentinell-perdues without, having Redouts round about, if the enemie be to be feared, or that he be near. *See the Leaguer of Prince Maurice before Sluys, and before Grave*, Fol. 87, 88.

It will be assured in the villages when the Alarme-place shall front the enemy, being eminent and commanding the ground round about it, capable to range the whole armie into order of battaile, fortified by art and nature, commodious for the advenues and sallies without confusion of the troups; That it be not assaultable without great disadvantage to the enemie, being near to the quarters, well defended by Artillerie, and well secured by Corps-du-guards, aswell of Infanterie as Cavallrie.

Concerning the quarters, they must be difficult to force and to assault (at lest unawares) facile to be releeved, and therefore near together, fortified, retrenched, and well guarded.

So then, all that is to be considered about the lodging of an Armie which is to be encamped for a long time (for, for one night it is onely requisite to make choice of places advantagious and such as are strong by nature, or to defend them by waggons or other meanes of enclosing the camp) consisteth in the commoditie of six things, namely, victuall, water, forrage, wood, situation, and enclosures of the field.

Having

Having regard to the certaintie of victuall and munitions by not adventuring too farre of; and leaving none of the enemies towns on the Flanks which might intercept or cut off your way; seeking out the commoditie of rivers, to be served of water to drink, for conveyance, or to impale with waggons, and to secure the one Flank of the Armie; it being impossible to be without them, and chiefly good ones.

For these reasons mountainous places are to be avoided, and also valleys; the one for the barrennesse, the other for the badnesse and discommoditie of the filthy pooles, and for the bad aire which they cause, being crude and foggie.

Regard must be had of the abundance, commoditie, and certaintie of forrage; for the horse make an incredible waste, besides that much is requited for the Souldiers to lie upon and to cover their huts with.

Good store of wood must be had for fires in the Corps-du-guards, and to build huts.

A care must be had that the place where you intend to encamp be smooth, plain, and sandy (if it may be) farre from any place that commandeth it, or if there be any, it must be seased upon and taken in within the retrenchment, to discover and command the champain.

If there be any wood near, you ought to make use of it and guard it, somewhat enlarging the retrenchment, and leaving roome between both, to meet with ambushes which the enemie might lay within it.

The forme of a retrenchment of an Armie is usually square, and the sides thereof ought to be fortified by Tenailles, to defend the one by the

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other, and ſo to be diſpoſed of, as in giving fire by night thoſe of the Armie may not hurt each other; making them more or leſſe ſtrong, as the enemie is more or leſſe to be feared.

Touching the particular things which concern the diſparting of the lodgings within the encloſure of the camp, theſe things are to be obſerved;

The retrenchement ought to be in breadth and depth two fadomes, and the paraper one fadom in height. Round about the inſide of the retrenchement there muſt be a ſpace left of 40 or 45 fadomes broad, which is called the Alarm-place, which muſt be ſpacious enough to contain the whole Armie in Battalia.

[a] *The proportion generally obſerved is 200 foot.*

Then follow the quarters of 300 foot [b] deep, which muſt be divided (for the making of the lodgings) after this manner;

[b] *The Authour ſaith 300 foot broad, but that is a miſtake.*

For a Companie of 200 footmen there muſt be 56 foot in Front, and 200 in depth, to make 4 rowes of huts, 25 in each row: between which there muſt be 3 ſtreets of 8 foot broad. Every hut hath 8 foot ſquare to lodge 2 ſouldiers. All the doores of them open upon 2 ſtreets, and anſwer juſt over againſt each other.

The

The quartering of a Foot-companie.

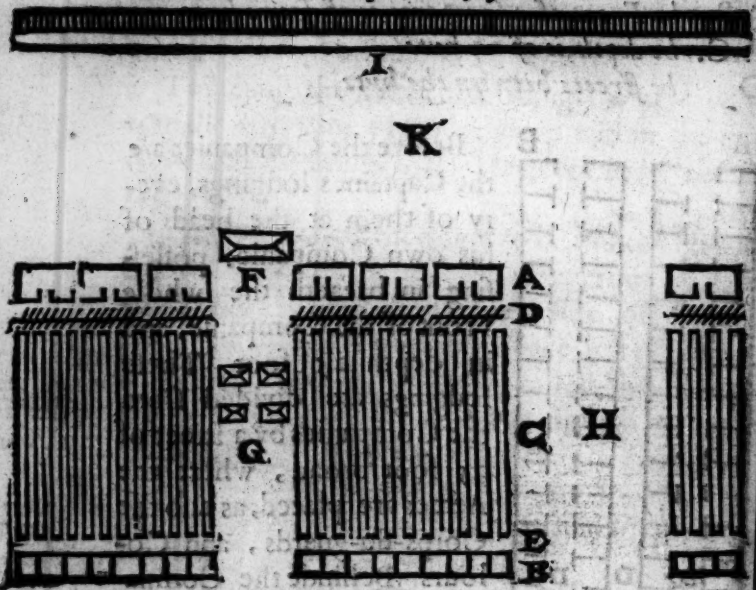
A,B. *The Front of a Companie, is of foure huts.*
A.C. *The depth, is of 25 huts.*
D. *The ſtreets between the huts.*

Before the Companies are the Captaines lodgings, every of them at the head of his own Companie, poſſeſſing in breadth the whole Front of the Companie, and in depth 25 foot. Theſe lodgings are divided from the Companies by a ſtreet of 35 foot broad, where the Armes are placed, as alſo the Corps-du-guards, and Colours. Behinde the Companies are the Sutlers huts, containing 20 foot in depth, and theſe are ſeparated from the Companies by a ſtreet of 20 foot broad. The Companies are divided from each other by a ſtreet of 8 foot breadth.

In the middle of the Regiment, there muſt be a place of 80 foot breadth, in Front of which the Colonell is to be lodged, and more inward, the Sergeant Major, Provoſt, and all the Officers of the Regiment. The ſpace between each Regiment muſt be 200 or 300 foot.

The

The quartering of a Regiment of six Companies of foot.



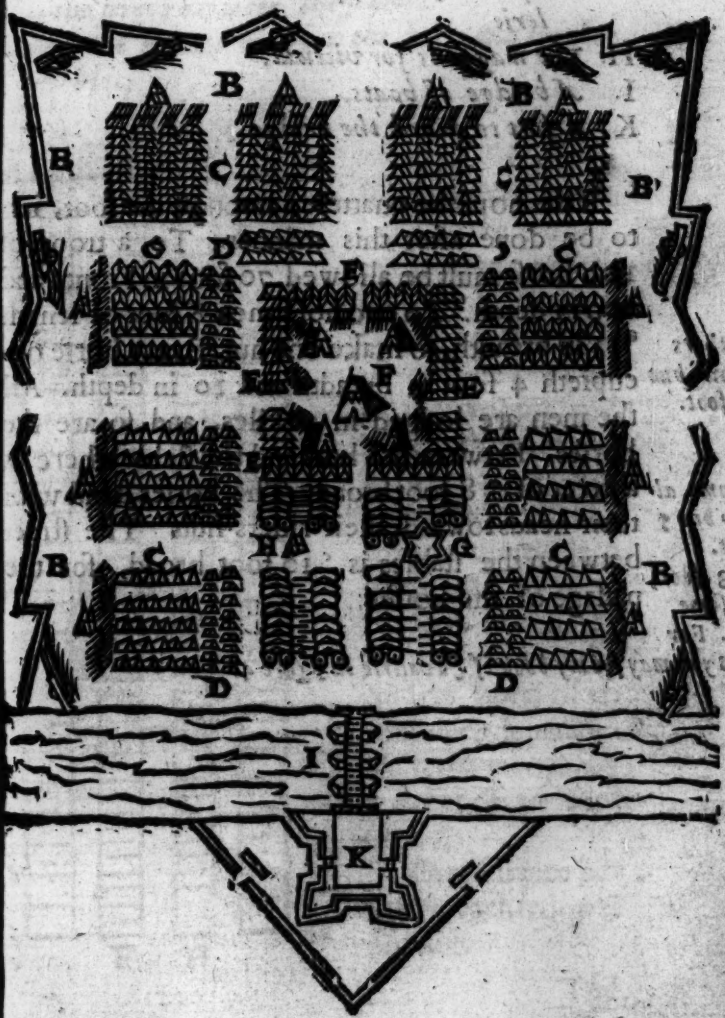
The placing of the Captaines tents at the head of their Companies, is now left off. And they are now in the Reare of them in and before the Sutlers: partly for that by this means the Captains can better take notice of, and so remedy the disorders which happen in the Sutlers huts: and that so the accesse to the Alarme-place may be the freer, for that the Captaines tents (taking up the ground before) hindred it.

I. *The retrenchment of the camp.*
K. *The Alarme-place.*
A.B. *The depth of the quarter.*
A. *The Captains lodgings.*
D. *A street between them and their Companies, where the Pikes are placed.*
C. *The Companies.*
B. *The Suttlers.*
E. *The street between the Companies and Sutlers.*
G. *A void place in the middle of the Regiment.*
F. *The Colonels lodging.*
H. *A space between the Regiments.*

When

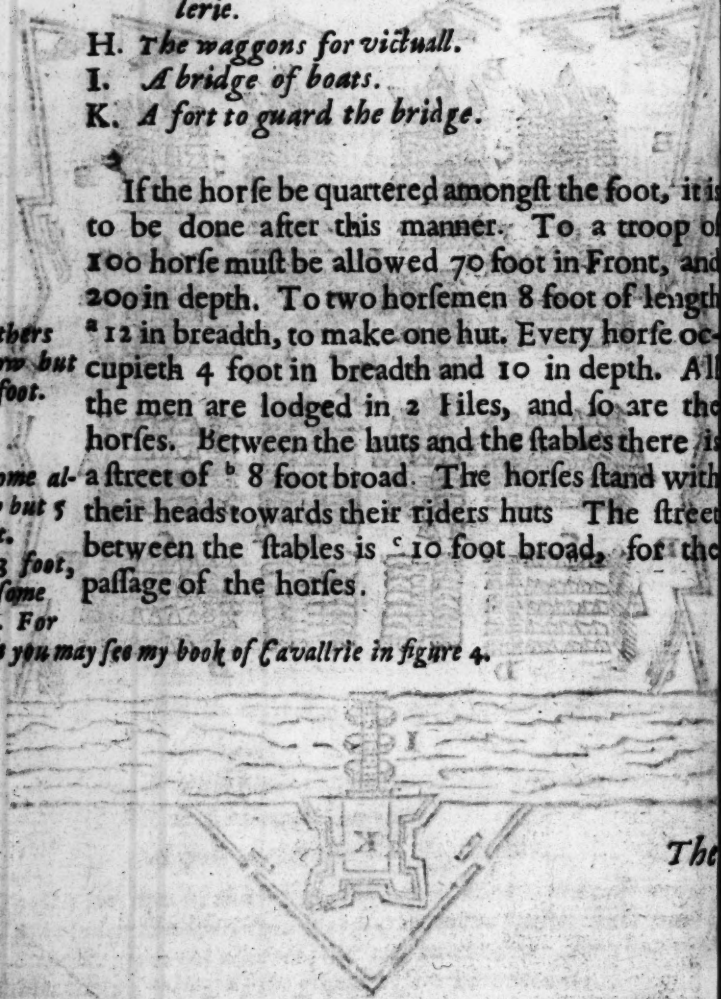
When the Infanterie is quartered alone without Cavallrie, it is disposed as the figure following sheweth.

The Infanterie quartered on the side of a river.



A. *The*

A. *The field of battaile.*
B. *The Alarme place.*
C. *The huts of the quarters.*
D. *The Sutlers.*
E. *The guards of the Generall.*
F. *The Generals lodgings.*
G. *The quarter for the powder and train of Artillerie.*
H. *The waggons for victuall.*
I. *A bridge of boats.*
K. *A fort to guard the bridge.*



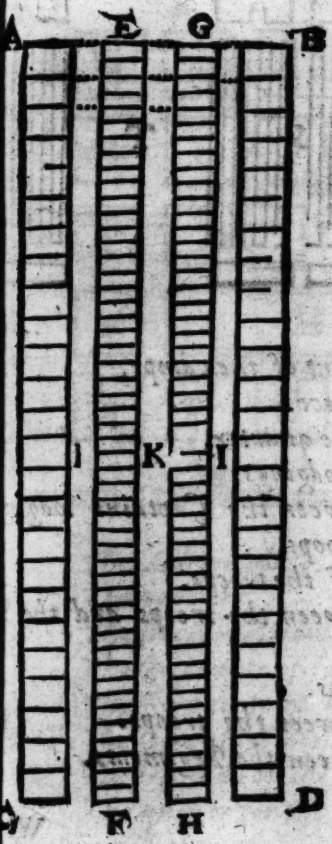
If the horſe be quartered amongſt the foot, it is to be done after this manner. To a troop of 100 horſe muſt be allowed 70 foot in Front, and 200 in depth. To two horſemen 8 foot of length [a] 12 in breadth, to make one hut. Every horſe occupieth 4 foot in breadth and 10 in depth. All the men are lodged in 2 Files, and ſo are the horſes. Between the huts and the ſtables there is a ſtreet of [b] 8 foot broad. The horſes ſtand with their heads towards their riders huts. The ſtreet between the ſtables is [c] 10 foot broad, for the paſſage of the horſes.

[a] *Others allow but 10 foot.*
[b] *Some allow but 5 foot.*
[c] *13 foot, as ſome ſay. For this you may ſee my book of Cavallrie in figure 4.*

The

The quartering of a troop of 100 *horse.*

B. *The Front of the troop.*
C. *The depth.*
C. *and* B.D. *The ſouldiers huts,* 25 *in each file.*
F. *and* G.H. *The* 2 *rowes of ſtables, each of them for* 50 *horſes.*
Is the ſtreet between the ſtables.
Are the ſtreets between the huts and the ſtables.

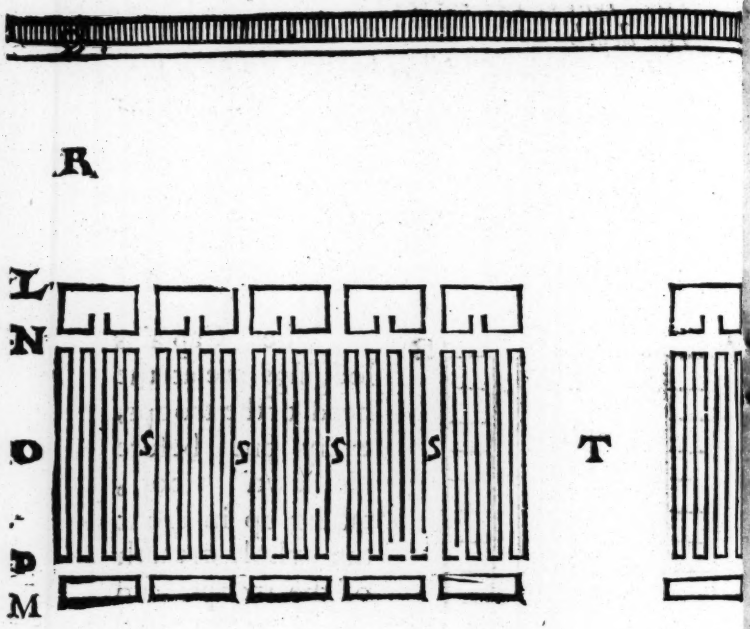


The Captains lodgings are at the head of the troops, every one before his own troop, taking up in Front the whole breadth of the troops, and in depth 40 foot. Betweene theſe lodgings and the troops there is a ſtreet of 20 foot breadth. Behinde the troops are the Sutlers huts, of 20 foot deep, ſeparated from the troops, by a ſtreet of 20 foot broad.

The diſtance betweene each troop is 20 foot.

The

The quartering of a Regiment of five troops of horſe.



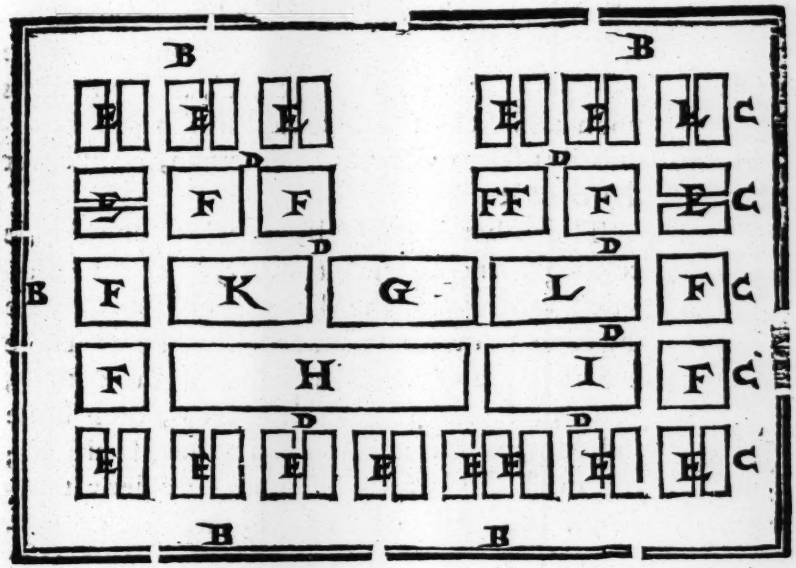
Q. *The retrenchment of the campe.*
R. *The Alarme-place.*
L.M. *The depth of the quarter.*
L. *The Captains lodgings.*
N. *The ſtreet between the Captains lodgings and their troops.*
O. *The lodgings of the trocps.*
P. *The ſtreet between the troops and the Sutlers.*
M. *The Sutlers huts.*
S. *The ſtreets between the troops.*
T. *The ſpace between the Regiments.*

When

When the horſe and foot encamp together, they are diſpoſed of as the figure following demonſtrateth.

It ſeldome happeneth that they are quartered together, by reaſon of the great annoyance which the Cavallrie bringeth to the Infanterie.

A quarter of Infanterie and Cavallrie, fronting every way.



B. *The Alarme-place.*
C. *The quarters.*
D. *The ſtreets between the quarters.*
E, *The Regiments of foot.*
F. *The Regiments of horſe.*
F. F. *The Generall of horſe.*
G. *The Generall of the Armie.*
H. *The quarter for the Artillery, and the Generall thereof.*

I. *The*

I. *The quarter for the Commiſsarie Generall of the victuall, and his train.*
K. *Lodgings for Strangers.*
L. *The Market and Shambles.*

Of embattailing the Armie.

Chap. III.

There be two kindes of occaſions of giving battaile; the one is particular, hapning between ſmall troops, as encounters which (for the moſt part) are given by accident, and ſometimes upon deliberation; alſo ſuch skirmiſhes as are ordinarily uſed to draw out, entertain, or diſcover the enemie.

The other is generall, as when one Armie coming to encounter the other, they give Battaile; wherein for the diverſities of times before the combat, during it, and after it, there muſt be had divers conſiderations. Before the combat, you muſt know the enemies forces, both horſe and foot, as alſo his Artillerie and Munitions; you muſt alſo know whereunto he chiefly truſteth, in what order he uſeth to fight, alſo the ſituation and paſſages of the countrey. You muſt make diligent diſcoverie of his deſignes and actions by your own ſpies, or the enemies, being corrupted with money or promiſes.

You muſt attempt to divide his forces, to raiſe jealouſies and diffidences between his chiefs, or between them and their officers, to incite his ſouldiers to mutinie.

You muſt ſtrive to ſeize upon the moſt advantageous ground to range the Armie into Battalia, having

having regard to the winde to avoid the duſt and ſmoak, and to drive it into their eyes; and to the ſunne, that you be not dazled: directing your ſelf according to the place, and the number of your own and the enemies forces.

The ſouldiers muſt be deprived of all hope of ſaving themſelves by flight, and muſt be brought to a diſpoſition to fight courageouſly; propounding to them the glorie, the bootie, the recompenſe, and the neceſſitie.

The order which muſt be obſerved in ranging the Armie for [a] combat hath been ſhewed in the firſt chapter, being the ſame as the march in battalia.

[a] *In my book of Cavallrie (before mentioned) you may ſee divers formes of battaile in figure 8, 9, 10, &c.*

The Artillerie muſt play ſo ſoon as they begin to diſcover the battaillons of the enemie, making the batterie fitly and ſpeedily, to diſorder and ſcatter them before they come to give battaile:

Whileſt the Armie ſtands ranged in battalia, expecting the ſignall for combat, the Marſhalls of the field ought to ride before the Van, to cauſe them to advance when the fight ſhall begin, according to the Generalls order, and to command the battaillons to joyne and charge the enemie, or to receive his charge according to occurrences.

The Generall of the Armie by his diligence ought to be as the ſoul in the body throughout all the members; alwayes obſerving the countenance of the enemie, to make his men fight to purpoſe; aſſiſting the broken battaillons by freſh ones, or by ſquadrons, and ordering thoſe which (having been diſbanded) ſhall rally again, to ſend them to

the combat to releeve their fellows. And becauſe ſuch as have been beaten will hardly return to fight again, you muſt not truſt too much to them.

As ſoon as you be within reach of the Canon, you muſt go on directly upon the enemie, (unleſſe you be ſhelrered from his Artillerie) by this means your ſouldiers are encouraged, you avoid the danger of the enemies Canon, and you leave behinde you the place where your Armie ſtood ranged, which ground will ſerve to rally and order the Battaillons which ſhall happen to be routed. You muſt not give on ſo haſtily, as that thereby the Battaillons be diſordered ; and on the other-ſide you are to uſe a marching pace untill you come within diſtance of a Piſtoll-ſhot, but then to double your pace and to charge furiouſly, the Pikes being cloſe ſerried, and the Muskets continually playing on the Flanks, having certain Targetteers in Front which may ſhelter the Battaillon, and diſorder the enemies Pikes.

You muſt give a ſufficient Front to the Battaillons, that ſo they may overwing the enemie, and charge him in Front and Flank, obſerving on which part the enemie giveth the moſt violent aſſault, and thither to ſend the troops of Reſerve; as alſo, where he is weakeſt, that there he may be the more eaſily routed ; diſſembling and concealing all ſiniſter accidents ; and whatſoever proves proſperous, to cauſe that to be publiſhed aloud, for the raiſing of their ſpirits which happily might be become heartleſſe, either by overmuch labour, or by the rumour of ſome diſaſter ; propounding to them the faintneſſe of the enemie, the death of his Commanders, the flight of his

his troops, the ſpoil, the honour of the victorie, and the great bootie; Sending the orders and commands by Officers and perſons known, and not from hand to hand by *paſſe parolle*.

After the combat, either you are vanquiſher or vanquiſhed: If you be vanquiſher, and have no cauſe to feare the enemie any more, as being not able to rally himſelf, either you content your ſelf with the victorie, or you attempt farther to conquer.

If you reſt content with this victorie, God is ſolemnly to be praiſed, the ſouldiers are to be reduced, commended, and recompenced, principally the Chiefs and ſuch as have performed any ſignall acts, ſharing out the ſpoil amongſt them according to their merits, giving order that the priſoners be truſtily kept and courteouſly uſed, cauſing the hurt to be carefully cured and the dead buried.

If you attempt to conquer the enemies countrey, you are to publiſh the victorie, for that will cauſe his confederates to ſhrink from their alliance, it will affright your enemie, and will make the Neuters to declare themſelves for the victour; it will keep your confederates faithfull and conſtant, your ſubjects obedient, and will procure favour from all men. Then the Armie muſt be ſupplied with men and munitions, the enemies garriſons muſt be ſummoned, recompenſing ſuch as ſhall yeeld the places within their cuſtody, dealing rigorouſly with ſuch as ſhall be headſtrong, gaining the great ones of the countrey by money, eſtates, and honour, attempting to ſeize upon the advenues and paſſages, and to leave nothing at your back which might hinder the paſſage of

your munitions and victuall. If you be vanquiſhed, either the enemie gives you time to retreat, or elſe he purſues you with all his forces. If he give you time, you muſt gather together all what poſſibly you can of your broken and ſcattered men, making your retreat reſolutely and honourably, and ſhewing your ſelf in the field again ſo ſoon as may be with the greateſt number of ſouldiers that can be gotten, to make head again againſt the enemie, to oppoſe his deſignes, to diſquiet and moleſt his actions, to work his confederates to oppoſe him, to divert and divide his forces, to fortifie the paſſages, to provide and furniſh your frontier places with victuall, munition, and garriſons.

If you be purſued with extremitie, you muſt retreat in the beſt order you ſhall be able, making it appear you are not vanquiſhed in your courage, though you be ſo in your fortunes; cauſing all your countrey to take armes, and that ſuch as ſhall be in armes do preſent themſelves at the paſſage to hinder the enemies entrance, breaking down the bridges and landing-places of rivers, cutting of the high-wayes, and felling of trees to lay a croſſe the high-wayes, breaking down the ſluces, and drowning the countrey, if it be poſſible, aſſuring your ſelf of the fidelitie of your cities and ſubjects, the one by forts, cittadels and garriſons; the other by hoſtages, offices and benefits.

Of the building of forts.

Chap. IIII.

BEfore the fortifying of any place, conſideration muſt be had of the ſituation: for if it be on a mountain which is all a rock, and that the place comprehendeth all the top, it will be difficult to approach, the flanks will be ſecured, it will be free from mines and command, it will eaſily diſcover round about, it will do horrible execution, and will be wholeſome both for the inhabitants and for the munitions. But ſuch a place hath uſually theſe diſcommodities, want of water and earth, hard to be retrenched, eaſie to be quickly blocked up, and the paſſages and advenues for the releeving of it, eaſie to be cut off.

If it be on a mountain which is not a rock, it will be ſubject to mining, the trenches of approach will be eaſily undermined, and it will have almoſt all the diſcommodities of the place above ſaid; but it will alſo have the advantage of ſtore of earth, and by that means it may eaſily be retrenched.

If the place be ſeated on a mountain which hath one or more advenues which command it, ſuch place will be eaſie to be aſſailed and battered from thoſe advenues.

If the place be mooriſh, the approaches are difficult, but the diſcommodities are great for them within it; for they are ſoon ſhut up, their ſallies are difficult and dangerous, the place is unwholeſome for the inhabitants, the

munitions are ſoon corrupted, and it is hard to be releeved.

If the place be on a plain, but commanded by one or more hills, it will have an infinite number of diſcommodities, and almoſt no conveniences.

If it be in a plain which is ſandy, the works which there ſhall be made will hardly be worth any thing.

But if it be on a plain champain, and levell on all ſides, the earth being fat and ſtrong, it will be eaſie there to fortifie, and to prevent the diſcommodities, having very advantageous conveniences.

But whatſoever the ſituation be, if you intend there to fortifie, you muſt firſt calculate whether your means be ſufficient, whether the ſeaſon be fitting, whether you have a ſufficient number of workmen and tooles, time enough to finiſh it before the ſeaſon change, or the enemie can come upon you; whether you have ſouldiers enough to guard it, ſufficient Artillerie to defend it, munition enough for the ſouldiers and Artillerie, victuall ſufficient for the men, and fodder for the horſes, ſuccours ſo near as that they may arrive within ſuch time as it may be conceived the fort may be maintained againſt the violence of the enemie.

If all theſe things do favour you, you may boldly fall to work, having regard firſt to the matter, and ſecondly to the forme.

Concerning the matter, if you have the commoditie of ſtone, brick, and chaulk, you muſt line all the works of the curtains, bullworks, and counterſcarps with good and ſtrong ſloapings, after this manner; thoſe of the curtain and counterſcarp

terſcarp have a fourth part of the height for their ſloap, and thoſe of the faces of the Bullworks a third.

The faces of the Bullworks muſt have ſpurres, ten foot diſtant from each other, of three foot thick and 25 foot long, the ſaid ſpurres being ſtrongly bound in with the wall, which muſt be built in arches underpropped 6 foot without the foundations onely on the ſpurres.

If you have onely earth, there muſt be ſuch a ſloap given to the works, according as they are ſtrong or ſandy, ordinarily of 5 foot one. Such works muſt be well furniſhed with palliſadoes, and environed with water, for they are ſubject to ſurpriſes, becauſe the ſhowers of rain and froſts make them moulder away.

Touching the forme, if it be regular (which is when it hath the ſides equall) ſuch as the fortification of one face is, ſuch are all the reſt. But if it be irregular (which is when the ſides be unequall, as all cities are which are repaired) the fortification on all parts muſt be diſagreeing. But what forme ſoever it hath you muſt obſerve the rules following as much as may be, and labour to make it equally ſtrong on all ſides.

Rules of Fortification.

That the angles or points of the Bullworks (which are called angles flanked) be made as great and blunt as may be; for the more obtuſe the flanked angles be, the better; and the angles flanking are the more ſharp.

A. B. C. *The angle flanked.*

B. C. D. *The angle flanking.*

That the ſhoulders of the Bullworks be made

maſſie enough to reſiſt the violence of the enemie, and to hinder him from ruining the flanks which they cover; and long enough to cover (in ſight) at leaſt half of the flank of the caſemat, when you behold it from the point of the counterſcarp of the oppoſite Bullwork. The caſemat muſt have of breadth the moytie of the thickneſſe of the ſhoulder, and the plain of it of 2 foot high above the plain of the drie moat, or of the ſurface of the water. The line of the thickneſſe of the ſhoulder, and of the breadth of the caſemat, is called the line of the flank, and the longer it is, the better: provided that it bring no diſcommoditie to the other parts.

F. G. *The thickneſſe of the ſhoulder.*
F. E *The breadth of the caſemat.*
E G *The line of the flank.*

That every face of a fortreſſe muſt have two flanks, that ſo it may defend it ſelf both on the front and on the ſides, and the one by the other.

O. *Is the center of the Bullwork.*
O.P. *A face of the fort.*
H. *Is one flank.*
I. *Is the other flank.*

That the lines of defence be not ſo long, that they be without the reach of your ſhot; nor ſo ſhort that the enemie (being lodged on the counterſcarp) be able with his musket ſhot to beat yours out of your caſemats.

I. B. *and* H. D. *are the lines of defence.*

That the Bullworks be large and hollow, capable of divers retrenchements, that there may be formed large flanks, and that they may contain good ſtore of ſouldiers: for the hollow room is the

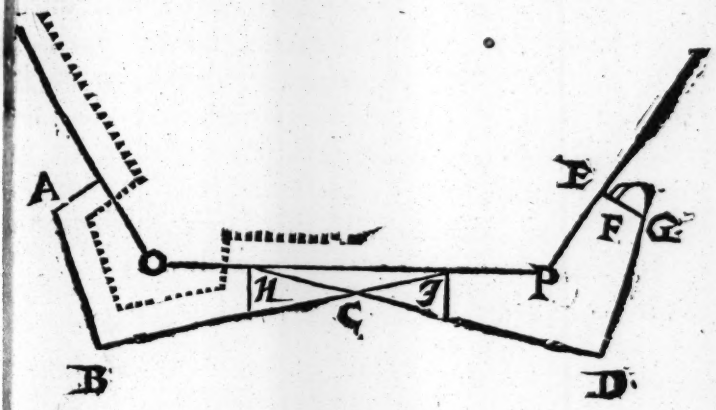
the place appointed to fight in, and to bear retrenchements.

O. *and* P. *repreſent the places of the Bullworks.*

The ſallie-ports ought to be placed between the ſhoulders of the Bullworks, and the caſemats.

F. *The ſally-port.*

A. B. H.B. I.D. *and* D.G. *the faces of the Bullworks.*



That the faces of the Bullworks and the curtains be ſunk within the moat to the upper line, and that upon this line there be a parapet of 8 foot height and [a] 3 foot thickneſſe. Then let the way for the rounds be 2 fathom broad (therein being comprehended the 2 foot-banks of the parapet) aſwell of the Bullworks as the curtains.

S. *The upper line or ſuperficies.*

T. *The parapet of the curtain.*

V. *The way for the rounds.*

X. *The foot-banks.*

[a] *Three foot for the thickneſſe of the parapet is (ſurely) farre too little. Maroloys and others ſay 20 foot. And the Authour himſelf ſayes from 15 to 20 foot, in the words following.*

That

That the rampart of the Bullworks be 15 foo high on the plain of the citie, and that of the cur tain twenty five, without reckoning the parapet briefly that it be ſo high, as it may keep the houſe from being battered and ruined. Let their parapet be from 15 to 20 foot thick, and 8 foot high.

Y. Z. *The height of the rampart of the Bullwork*

Z. θ. *The thickneſſe of the parapet.*

The ditches muſt be from 12 to 16 fathom broad, and from 5 to 6 deep, beneath the cove way (being drie) if it may be, having a ſmall ditc in the middle of 20 foot broad, and as much more in depth. If the moat be full of water, i muſt be 20 fathome broad, and from 4 to 5 fa thome deep, and divided by a dam of earth of 3 foot thick. The town wall muſt be high enough becauſe the depth of the drie ditch which giveth height to the wall, is here filled with water.

M. S. *The breadth of the ditch.*

M. N. *The depth.*

The covert way muſt be from 3 to 4 fathoms broad, having a parapet of 10 or 12 foot high, th moytie of it being ſunk into the plain.

L. M. *The breadth of the covert way.*

K. L *The height of the parapet of the counterſcarp*

The parapets muſt be of earth, or of unburnt brick, except the outward row, which muſt be of burnt brick, to reſiſt the injurie of weather.

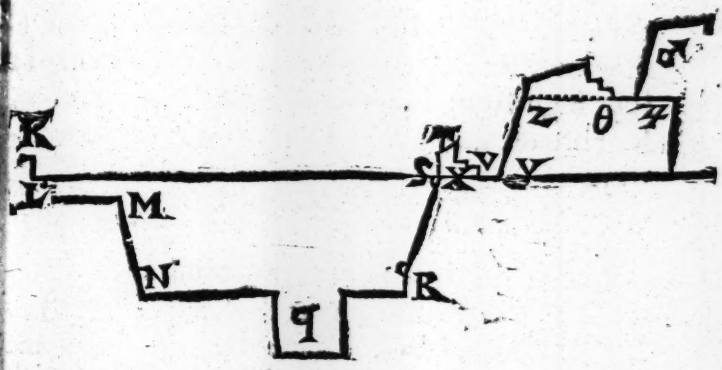
If the curtains be long, there muſt be a caval lero ſet on every point; but if they be ſhort there will need but one, which ſhall be on the middle of them. They muſt be ſo high as they may com mand all the works, and the hillocks without, if there be any, and if it may be. They are common ly raiſed 10 foot above the rampart. Their length

is

is taken from the number and qualitie of the Artillerie which you would plant thereon ; and their breadth dependeth on the length and reverſing of the pieces of Artillerie, and of a parapet of three fathomes and a half thick.

24. 8. *The height of the cavallero upon the rampart.*

The pieces of ordinance nearer to the center of the fort muſt command thoſe which are farther off ; raiſing the one above the other from 8 to 10 foot.



That all the walls of the Bullworks and curtains turn their Front from the oppoſite places which command them, leading them bias-wiſe, that ſo the batterie be not raiſed perpendicularly upon it, and that the bullet may glance by means of the bias and ſloap, and that they be not commanded nor ſeen from farre off.

The market place of the citie (or ſuch places where the grand watches are kept) muſt be covered in the middle, to ſhelter the battaillons from the rain, and there muſt be pent-houſes along the ſtreets, which lead to the rampart, to the ſame end.

The

The ſtreets ought to be 6 fathom broad at the leaſt, that ſo the waggons and Artillerie may paſſe the freelier.

The ſtairs to paſſe to the covert way of the counterſcarp, muſt be juſt in the middle of the curtain, between the two flanks of the Bull works.

h *Stairs of the counterſcarp.*

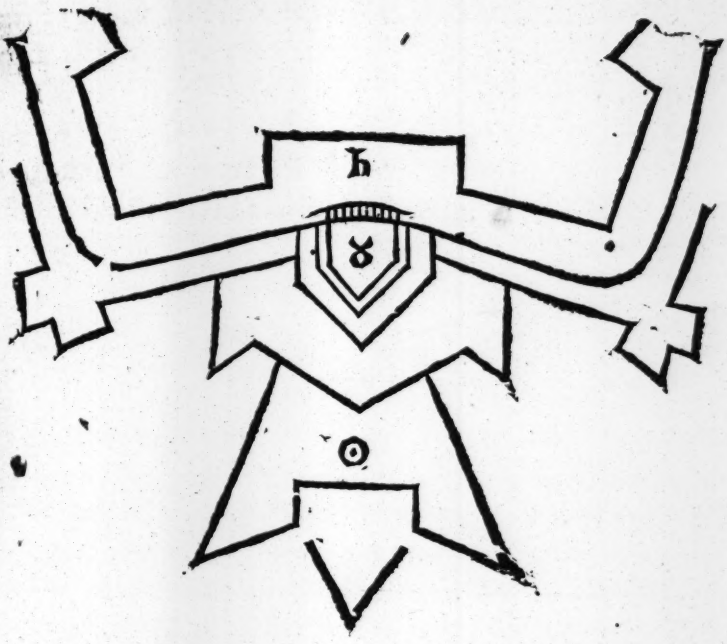
There muſt be half moons made on the fore part of the curtains, right over againſt the angles flanking on the counterſcarps; having their face defended by Bullworks open behinde, that ſ they may be defended by the curtain, being 1 foot high from the plain; having a ditch of 2 foot broad and 15 foot deep, beneath its covert way.

& *A half moon.*

Before the half moons you muſt advance te nailles or hornworks, and at the head of them hal Bullworks, and before them redouts, caſting th earth on that ſide towards the citie, which wil ſerve for a parapet. Theſe works muſt be 10 foo deep and 15 foot broad, and muſt be defende from the citie and from the counterſcarp.

⊙ *Trenches, half bullworks or counterpoints.*

The



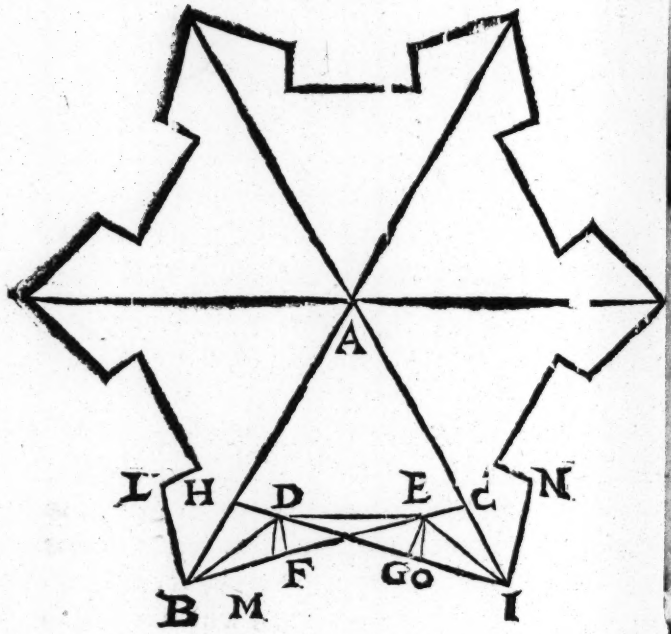
The French and Spaniſh draw the lines of defence from the flanks of the Bullworks; and the Hollanders and Venetians draw them from the middle of the curtain; and this laſt manner ſeemeth to be beſt, even in great places, by reaſon of the abundance of firings, which ought to be preferred before the form of flanked angles.

The inconvenience of ſuch places as overtop or command you, may be remedied, either by caſting them down, ſheltring your ſelf from them, or poſſeſſing and fortifying them by a hornwork or tenaile, or by two half Bullworks, or by one Bullwork and two half ones, thereafter as they be in greatneſſe: at leaſt you muſt be ſheltred from them by good and ſtrong traverſes.

Theſe

These that follow are foure severall wayes of fo
tifying, according to the French, Spanish, Lo
countrey, and Italian fashions.

The manner of fortifying places according to the French.



A. B. C. *and* A. I. H. *Are each of them 2 h*
right angles, that so you may have L. B. F. a
G. I. N. *right.*

B. D. *and* I. E. *divide the half-right angles, in*
two equall parts.

D.

D. F. *is perpendicular upon* B. C.

E. G. *is perpendicular upon* I. H.

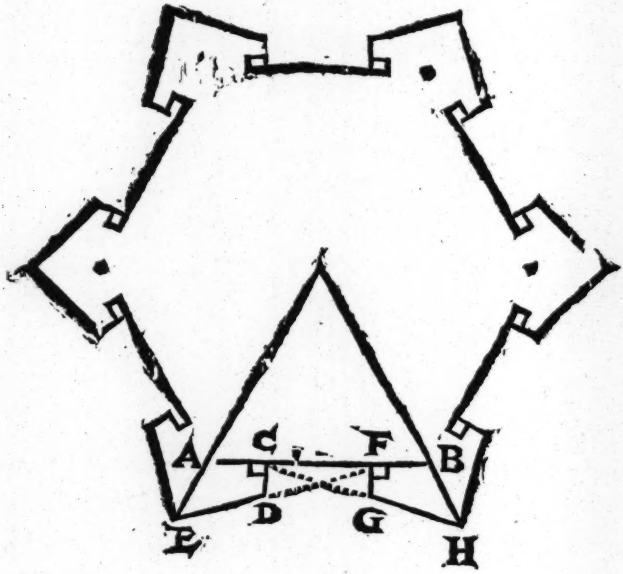
In the figures which have leſſe then nine ſides: but in thoſe figures which have above eight, they are perpendicular upon D. E. *As* M. D. *and* O. E.

B. F. *and* G I. *are the faces of the Bullworks.*
D. F. *and* G. E. *are the flanks.*
D. E. *is the curtain.*
B. E. *and* I. D. *are the lines of defence, from* 100 *to* 120 *fathome long.*

The

The Spaniſh fortifications.

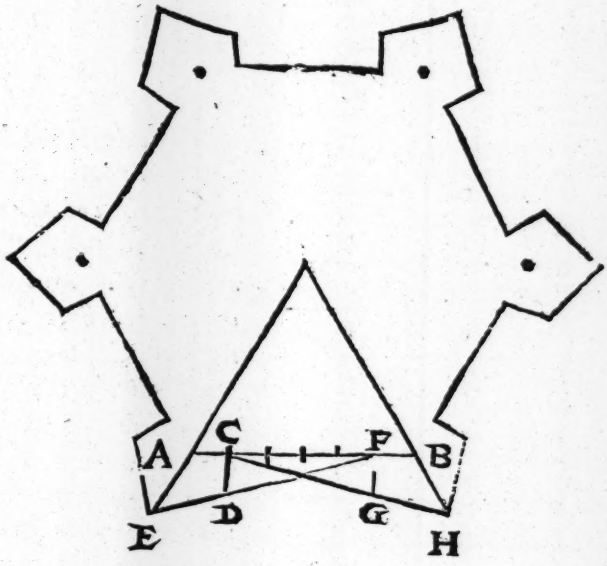
When the Bullworks are made with eares or orillons.



A. B. *Muſt be divided into* 8 *equall parts.*
A. C. *and* B. F. *have each of them two.*
C. D. *and* F. G. *have each of them one.*
E. F. *and* H. C. *muſt be from* 850 *to* 900 *foot long.*

The Spaniſh fortification.

When the Bullworks are made without orillons.



A. B. *is divided into 6 equall parts.*
A. C. *and* B. F. *have each of them one.*
C. D. *and* F. G. *have alſo each one.*
E. F. *and* H. C. *muſt be from* 850 to 900 *foot long.*

Low-Countrey fortification.

In this table you may finde the quantitie of the angles flanking and flanked, in this manner.

The angles of the figures.	The moitie of angles flanking.		Angles flanked or Bullworks.	
A	C		E	
4	75	0	60	0
5	70	30	69	0
6	67	30	75	0
7	65	21	79	17
8	63	45	82	30
9	62	30	85	0
10	61	30	87	0
11	60	41	88	38
12	60	0	90	0
13	59	25	91	25
14	58	55	92	9
15	58	30	93	0
16	58	7	93	45
17	57	47	94	25
18	57	50	95	0
19	57	14	95	32
20	57	(	96	0
B	D		F	

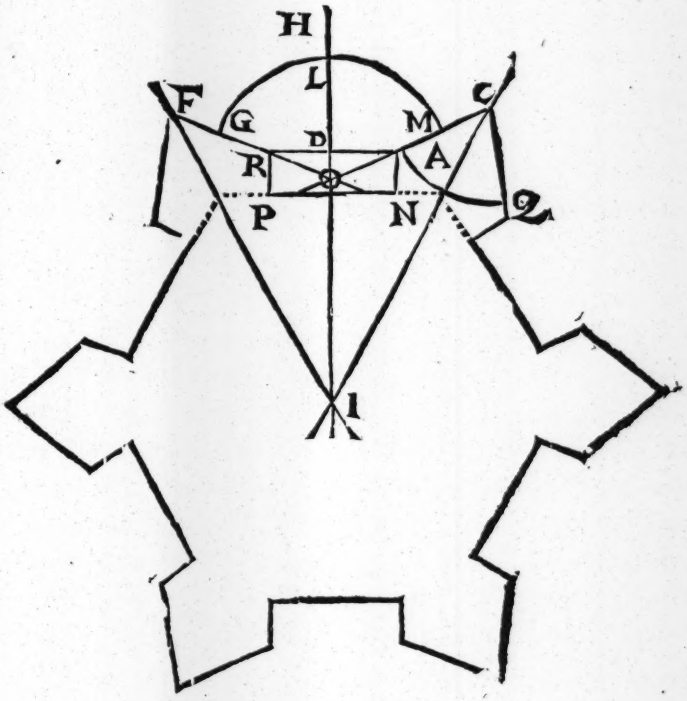
The best approved Authours (for Low-countrey fortification) as Samuel Marolois, Freitag, and others, dissent much from this table.

To finde them in i figure of 6 angle look in the columne A B. the number of th angles 6. and ju over against it in th columne C D. you sha finde for the moytie o its angle flanking 6 degrees, 30 min. An in the columne E. F you shall finde for th angle flanked 75 deg 0 min.

To

To deſigne a fortification of 6 Bullworks, draw the line H. I. *ſet the compaſſes in* O. *and make the ſemi-circle* G. L. M. *then mark* L. G. *and* L. M. *each of them of 67 degrees 30 min. then draw the ſtreight lines* O. G. *and* O. M. *you ſhall have the angle flanking* G. O. M. *of 135. deg.*

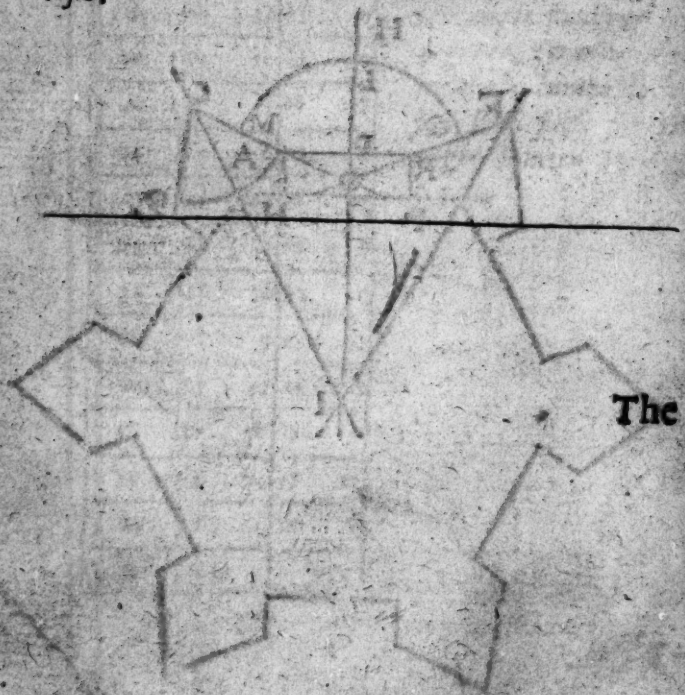
After that, make the ſtreight line R. A. *which cuts with right angles the line* H. I. *(it matters not whether it be near or farther off from* O.*) divide it into 5 equall parts, and give foure to each of the lines* R. F. *and* A. C. *which will make the faces of the Bullworks. Then divide one face into 5 equall parts, and give two to each of the flanks* A. N. *and* R. P. *which muſt be perpendicular upon the line* R: A. *then draw the line* P. N. *which will make the curtain.*



Place the compasses on the point C. *make the semi-circle* A. Q. *of* 75 *deg.* (*as is marked in the table*) *then draw the line* C. Q. *and you shall have the angle of the Bullwork* A. C. Q. *which being divided into* 2 *equall parts, by the right line* C. I. *will make in* I. *the center of the place.*

It is a generall rule, that the faces of the Bullworks are the foure fift parts of the curtains, and the flanks the two fift parts of the faces of the Bullwork.

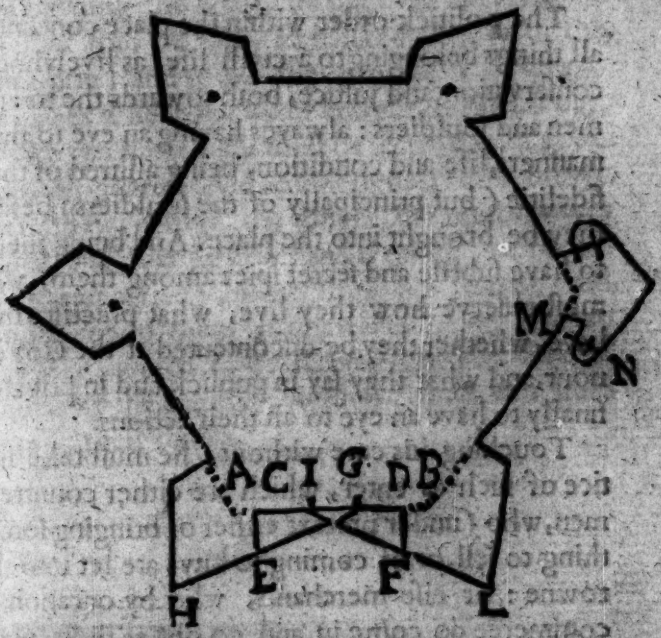
The faces of the Bullworks, in great figures, must have 400 *foot; in mean figures* 350, *and in small ones* 300. *You may forbear the precedent table, observing* (*for a generall rule*) *to give to the angle flanked three fift parts of the angle of circumference of the figure which you intend to fortifie.*



The

The Venetian fortification.

The distance of the one Center of a Bullwerk to the other A. B. is never longer then 200 Venetian paces, of 5 foot a pace: nor shorter then 150, that so the line of defence be neither too short nor too long.



A. B. *must be divided into 6 equall parts.*
A. C. *is the sixth part of* A. B.
C. E. *is equall to* A. C.
H. G. *is drawn from the third part of the curtain, in the figures of lesse then 8 sides: and from the middle of them in the figures of more then 7.*
M. N. *divideth it self into 3 equall parts, two for the shoulder, and one for the casemat.*

Of the defence of fortresses.

Chap. V.

THe defence of fortresses dependeth on the good order which the Governour observeth, as well within as without the place, be it for matters politick or militarie.

The politick order within the place containeth all things belonging to a civill life, as livelyhood, conservation, and justice, both towards the townsmen and souldiers: alwayes having an eye to their manners, life and condition, being assured of their fidelitie (but principally of the souldiers) before they be brought into the place. And being there, to have subtile and secret spies among them, who must observe how they live, what practises they have, whether they be discontented at the Governour, and what they say in publick and in private: finally to have an eye to all their actions.

Touching his care without, he must take notice of such as enter, which are either countreymen, who (under pretext either of bringing something to sell, or of coming to buy) are let into the towne: or else merchants, who by occasion of commerce do come in and go out at their pleasure. Of these there must be regard had whether they deal with persons suspected, or that themselves be such, or whether they come from some suspected place; and not to suffer any to enter, but persons of good assurance, and well known.

The militarie care hath respect either to the gates or the walls. Of the gates, either at the opening or shutting of them.

Con-

Concerning the opening of them, he must (before the setting of them open) send out an officer with some souldiers, to discover whether there be any ambushes in the suburbs, churches, fields, decayed buildings, hollow wayes, valleys, ditches, inclosed gardens or woods: and at the shutting of them, the Sergeant Major must be there assisting as often as may be, and so search and feel the locks with his own hands.

Touching the walls, he ought to have regard whether they be low, ill flanked, decayed, tho moat drie; and to use the remedies; as also to the places where the water entreth, or issueth out.

The gates and walls must be secured with good corps-du-guards, and sentinells near each other. He must never slight the danger, but must alwayes suspect and fear surprises and treasons, being vigilant and active: often visiting his guards, and coming upon them at unawares: that so they may fear as much to be surprised by the Governour as by the enemie; which course will hold them to their duties.

Of the taking of fortresses by petard or any other surprise, or by treacherie.

Chap. VI.

THey which have an enterprise upon any place, will surprise it either by petard, or by scalado, or by some other defect which is in the gates or walls, or else by intelligence and treacherie.

If you would surprise it by petard, you must first well know the gates, rails, barres, pallisadoes, draw-bridges, bridges, pitfalls, portcullices, and grates: and the places of the flanks, whether they be on the sides, above, or before; whether the ditch be drie or filled with water; whether it be broad or deep; whether there be loop holes over the gate, corps-du-guards, and in what place; whether the entrance into the gate be right on or winding; and in all these things you must observe how many paces there may be of length, breadth, height, and distance between piece and piece, as near as may be.

The place being discovered, you must make use of stratagems to cloak your intentions, and to divert your enemy to some other place.

When there be any suburbs, decayed houses or any woods near the place which you intend to surprise, you may make use of them to facilitate your approaches, and to lay your ambushes, also the easier to discover what is done about the gates of the town, so to lay hold on the occasion at the instant when you see it fair for you; and to receive advertisements by those persons which you shall have sent to discover the place.

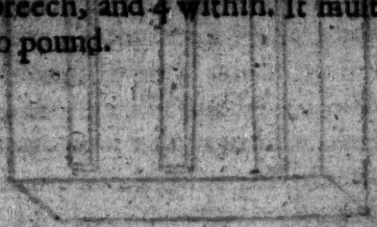
Being

Being thus near, you may to good purpoſe releeve thoſe which give the firſt onſet, and diſpatch the readier; yet you muſt not approach ſo near, as that you be under command of their canon, for fear (if you be put to the retreat) you be had by the breech.

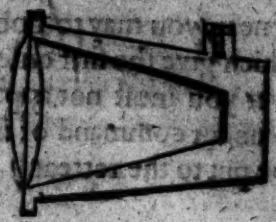
The time well taken doth much facilitate enterpriſes, which is uſually a little before day, by reaſon that the ſentinels (being wearie and faint) do ſleep, and darkneſſe favoureth the approaches, and ſerves for cover of thoſe which put the plot in practice, prepare the engines, and plant the petards, and thence gives terrour to the aſſailed.

The petards muſt be made of fine or red copper, with a tenth part of braſſe. That for the bridge muſt be 11 inches long, and at the breech 7 inches and a half about, and 5 inches wide within. The metall at the breech muſt be one inch and one fourth part thick, and a half inch thick at the neck, without reckoning the muzzel ring. The mouth muſt be 10 inches wide, and it muſt have three handles, and a pipe over the touchhole joyning to the breech. It muſt weigh from 60 to 70 pound of metall.

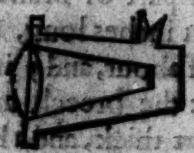
That for gates with overthwart barres, muſt be 9 inches long, five twelve parts of an inch thick at the neck, and one inch at the breech. The mouth 7 inches wide, 6 on the outſide of the breech, and 4 within. It muſt weigh near upon 40 pound.



That



That for gates with plain bolts, or for paliſa-does, muſt be 7 inches long, one third part of an inch thick at the neck, and three fourth parts of an inch at the breech, the mouth 4 inches wide, 3 inches and a half at the outſide of the breech, and 2 within. It muſt weigh near upon 15 pound.



Between the petard and the bridge, there muſt be a madrier or wooden planchier placed, 1 foot and a half broad, 2 foot long, and 3 inches thick. If the wood be not very ſtrong, it muſt be ſtrengthened with plates of iron, being ſet on athwart on the outſide of the planchier, and lengthwiſe on the other ſide.

The

The charge of the petard for the bridge is from 5 to 6 pound of powder; of those for strong gates from 3 to 4 pound. And for pallisadoes from one pound and a half to two pound. They must be charged with the finest powder that can be had, beating it hard into the petard (but not so that you bruise the grain) which must be stopped with a wooden trencher or plug of an inch thick, very justly fitted, and some molten wax to be powred on it to close the rifts, and to keep the water from getting in, if perchance it should fall into the water. The petard must not be charged up to the mouth, but there must be 3 fingers breadth left, which room must be filled up with towe or such like, which must be prested down very hard, and then there must be a linnen cloth to cover the mouth of the petard, close bound with a cord about the neck, to keep it in. Over the touchhole there must be applied a stopple of cork, and over it a plaister of wax or pitch, for fear of water.

Before the petard be busie on, you must have a priming iron to stirre the priming powder, which must be of a slow mixture (that so the petardier may have leisure to retire, before the revenge of the petard surprise him) and it must be fit to receive water. It is compounded thus; take 3 parts of fine powder, 6 of sulphur, and 9 of saltpeter, pound each of them apart very small, then mix them together in a dish with a stick; then powre oyle of petar into it by little and little (that so it may not become as a paste) and let it dry throughly in the shadow, then take your pipe with it.

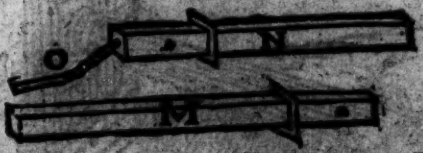
The easiest way to hang the petard at the barres or gates is by a fork, as this figure sheweth.

But

But the petard for the bridge must be applied by a carriage, made as followeth.

It must have a counterpoise at the taile mounted on 2 wheels of three foot and a half high, and two inches and a half thick, mounted on a square iron axletree, one inch and a half thick. The point of the carriage A. B. *must be broad enough to contain the petard, namely one foot;* C. D. *3 foot,* A. E. *20 foot,* E. C. *6 foot. The carriage is composed of 3 long planks* C. A. G. H. D. B. *each of which are made of 4 pieces, bound about with rings of iron, as is shewed in* H. I. K. L. *and are to be taken asunder, to make them portable, as is seen in* M. N. *And are then fastned together with the pin* O *as is shewed by* 8. *These 3 planks are fastned together by barres 2 inches broad, and 1 inch thick, one foot distant from each other, as in* F. *The breadth of the planks is* P. Q. *5 inches,* Q. R. *2 inches,* T. V. *8 inches,* T S. *3 inches. Along the plank of the middle of the carriage* G. H *there must be a range made to lay a train to give fire to the petard.*

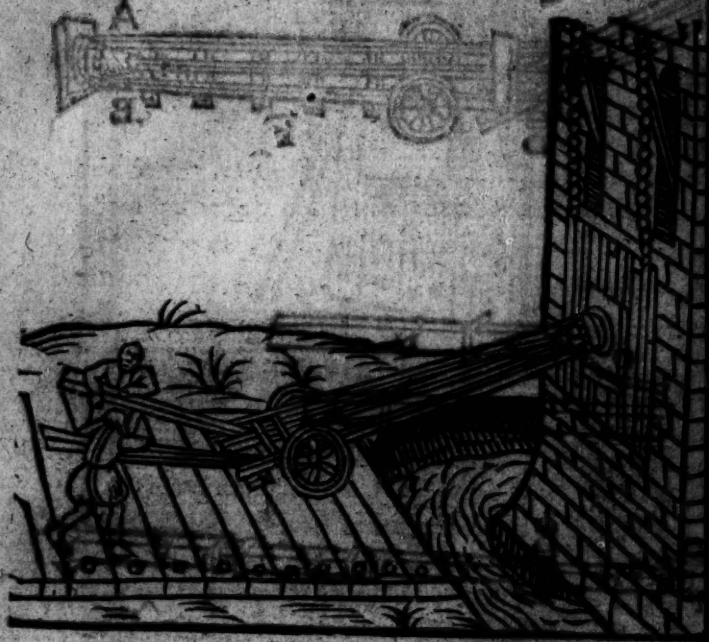
The



The rowling bridge must be made even as the carriage, saving that it is as broad at the end X *as at the other* Y. *and is covered with planks, as is shewed in* Z.

Two

Two men may easily thrust forward the carriage, and apply the petard to the bridge.



When there is a gate between the bridge and the draw bridge, the petard must be hung just at the middle of the bridge; but when there is no gate, the petard must be placed just against the drawbridge, that so meeting with the violence thereof, it may raise it on high, and by that means bear down the drawbridge.

If the bridge joyn not close aloft (as often it hapneth) the petard must be placed as high as may be; for the violence of the blow which it will give against the stone-work of the gate, will fell it down.

To fell down a drawbridge which joyneth not well to the wall, it may be done without petard, by

y a tortois of braſſe placed between the wall and
ie bridge, which will fell it down with the crack
fit.

This tortois is made thus; Take 2 diſhes of
raſſe which are made hollow 5 inches, 1 foot
road, and 2 inches thick; joyn them one againſt
he other, and fill them with powder.

Ordinarily the good order, and good proviſion
of all things neceſſarie, cauſeth the execution to
ucceed well: ſo the leaſt diſorder hindreth it.
Therefore every thing muſt be commodiouſly
ordered, diſtributing to ſeverall commanders the
diverſitie of things which muſt be executed; as
to arrive at the place 2 houres before day, to ſend
out to diſcover, to know whether the enemie be
not advertiſed, and whether he keeps himſelf on
his guards (which would give you cauſe of chan-
ging your purpoſe) to cauſe your carriages and
rowling bridges to be joyned together farre
enough from the gate, that ſo they of the town
may not hear the mulle go which carrieth them,
and the noiſe of them which are to unloade them:
to cauſe the petardiers to advance, each of them
carrying his fork and planchier, and on his ſide a
man carrying his petard, which ſhall make over-
ture of the barres, palliſadoes, and gards, ſo that
the carriage of the petard for the bridge may
paſſe, that ſo they may fell down the bridge. If
the bridge be in ſeverall pieces, they muſt be
drawn together with hooks. If one ſhaft keep up
aloft, a petard muſt be applied to it. If the bridge
fall into the moat, you muſt make uſe of a rowl-
ing-bridge. After that, there muſt be 2 crutches,
ſhoars, or treſſels for under the portcullice to hin-
der it from being let down: but if it be let down
before,

down before, it must be overthrown by the vio-
lence of petards with great planchiers (if it b
of wood) but if it be of iron, you must have
petard with strong handles, to fasten one or mo
bowts of iron chains about them, having hooks
each end to grasp good store of barres.

The gate being opened, you must readily su
cour the first which seized on it, charging furi ou
ly upon those which shall oppose and make hea
against you, casting granadoes and fire-po
amongst them to disorder them, attempting t
gain their barricadoes by musketiers and pikes
making all possible speed (for in this busines
diligence doeth all) hindring the assailed from
gaining time to joyn or rally themselves toge-
ther, and to form a body to drive you out. You
must place sure guards at the gate, and seize upon
the corps-du-guard (which is upon the wall
and ramparts) also on the market-place, the
churches, the town-house, and all places where
the inhabitants might assemble, fortifie, and render
combat. You must also succour those of your
men which shall meet with resistance, keeping
them from pillaging, commanding every man to
stand firm in his appointed place; untill the guards
be placed, all the streets and parts of the town be
secured, and the quarters and lodgings for every
one be laid out. But if you would surprise a gate
of a town without petard, you must by discoverie
or intelligence know whether it be ill guarded,
whether there be few souldiers, whether they
wander farre from their armes, whether the corps-
du-guard be placed in a fit place to be surprised,
whether the souldiers keep within it or about it;
whether they leave the gate at any certain houre,

(as for their meals, their devotions, their sports, or gathering of corn or grapes.) To know whether their commanders know their severall charges, or whether they be negligent or ill obeyed, and that therefore the guards be disordered, whether there be any place near, fit to favour your embuscades (as ditches, garden walls, hemp, corn, hollow wayes) to give on upon the gate at the opening of it, amongst the throng of those that issue out, or a little after; for the guards (having quitted their armes, and put out their matches) may be surprised, before they can have means to recover themselves.

You may cause the gates to be surprised by souldiers disguised, in the habit of country fellows, women, or merchants, bringing or conducting of wares, wood, or hay, on their backs, by cart, waggon, or boat (if there be a river, lake, or sea) which may seize upon the gate, and hold it so long till they which are in ambush come to relieve them.

If you would surprise a place by scalado, you must first (by discoverie) know the advenues, the counterscarp, and the moat; to know whether you may come thit undiscovered, go in and out without difficultie, and that over against the place where you mean to give the scalado, without being compelled to take any great compasse about the same, otherwise you are in danger to be knocked, and taken in a trap. You must know whether the moate be dric or frozen, or the water shallow, without mud, and easie to wade through; whether the wall be low, so that it may be scaled, whether the place (where you mean to give on) be faire off from the corps-du-guard or sentinell,

that you may not be discovered, whether the place be large enough to raise good store of ladders, and consequently for many men to enter at once; or strait, where you must enter one by one; and to see, whether (after some of the first be entred) you could make a greater overture on the place, or at least to have time to be all entred before day, or being discovered, to discover the place of the corps-du-guards, the neare place to be ranged in battalia, the market-place and churches, and to cause them to be seized upon by batallions, sending them at one and the same time towards the right and left hand, and right forward, the grosse remaining firm in battalia to send succours where need shall require, keeping neare some gate to gaine and open it, to let in the Cavallrie.

A place may be surprised (at the walls) without scalado, by some defect in them; as when they are old, decayed, weak, of little thicknesse, of brick, stone, and clay, and without rampart, for they may easily be pierced by some engine or instrument: or if there be any lowe windows along the curtain, or any sallie-ports, or any sink-holes or drains for filth, or places for water to passe in and out, being ill guarded and weak.

Intelligences and treacheries may take effect, when some occasion shall give you means to corrupt the fidelitie of those of the place, which are able to give you entrance and deliver you the same. These occasions will be when you shall discover a possibilitie to convey some desire of change into their mindes, which often happeneth amongst high-minded souldiers which

desire

desire to make a fortune; or amongst those which are revengefull, when they be discontented at the Governour or some other officer. Besides, most of them think themselves ill dealt with, when they be not advanced to offices, having a higher estimation of themselves then they deserve; and others be so covetous, as there is nothing which they will not undertake for money. These and the like things may accompanie intelligences and treacheries.

How to besiege and expugne cities.

Chap. VII.

A Citie is said to be taken by force, when it is carried with an Armie by batterie; whereunto there belong three considerations: The first before the enterprise; The second, during the time of the siege; and the third, after the taking of the citie.

Before the enterprise, you must consider, whether you ought and whether you be able to do it.

You ought, when by this means you recover your own, weaken your enemie, you secure and fortifie your self on that part, you encrease your revenue, and you get good store of bootie. But you ought not to do it, if the charges of the siege will surmount your profit, or that it will be difficult to hold the place after you have gained it, or when it is so strong, so well provided of all necessaries,

or so near to places of releef, that there is greater likelihood of damnage, then hope of good successe.

You are able, when you have all manner of provision necessarie for the enterprise, and that in sufficient measure. The most necessarie things are money, souldiers, artillerie, munitions for the armes, as powder, bullets, morters, granadoes, muskets, pikes, &c. And for the instruments, as shovels, pickaxes, hand-barrows, wheel-barrows, sacks, baskets, &c. And for wood to make platforms for the artillerie, gabions, sauceidges, blindes, boats, &c. And victuall in abundance. The quantitie of all these must be measured by that which shall be requisite for the souldiers, the canon, and the time that the siege may be like to continue, which may be computed by the proportion of your forces compared to those of your enemie; by the qualities of the works of the place, with the number of your munitions and artillerie; by the garrison, with your number of souldiers; by the situation of the place, and the releef which might be brought to it, with the meanes which you shall have to stop and hinder it, and to facilitate the bringing of victuall into your camp; by the distance, with the meanes to lead your armie thither; by the qualitie of the ground, with the conveniences which you have to make your approaches.

And because that oftentimes accidents do befall which were not foreseen, as by unexpected releef, an inundation or overflowing of waters, a change of weather, a mutinie amongst your own men, or a contagion.

There must be a provident care taken for a re-

treat,

treat, ſo as (being conſtrained to it) it may be made commodiouſly and eaſily without diſorder, if it may be; for thereon dependeth the honour or diſhonour, the profit or damnage of the aſſailant.

During the ſiege, you muſt obſerve many things with good order, and principally theſe; Firſt, you muſt environ and ſhut up the place, entrenching your ſelf round about, fortifying your ſelf as well againſt thoſe which might come to releeve them, as againſt the ſallies of the town, in ſuch ſort as not any perſon may be able to go in nor out; chooſing a fit place for the Armie to ſet down, to make the field of battaile, to make your quarters and their alarm-places. Taking care that the quarters be ſecured by good retrenchments and forts, well flanked and guarded, within againſt the ſallies, and without againſt ſuch as might come to releeve the place, or diſturb your Armie; that they be commodious to receive and conſerve the munitions for actions and executions. You muſt diſpoſe the approaches, run your trenches, make your way to arrive in ſafetie to the place where you intend to raiſe your batterie, obſerving that it be as ſhort as may be, ſheltered and faithfully guarded by a good number of men, having room enough between piece and piece, and for their reverſe, and that they command the place which you intend to batter; that the trenches be ample, large, deep, not ſtraitned, well flanked and defended by forts more or fewer, according to the ſtrength of the garriſon which is within the place, and to the time in which the releef might arrive.

During the time whileſt you are making the

trenches of approach, you must take away all the high flanks with the canon, then having run your trenches to the counterscarp, you must raise platforms with beds for the Artillerie, near the points of the counterscarp, to take away all the low flanks, by this means to render the passage of the moat secure. And whileſt this batterie is a making, you must pierce the counterscarp, and advance your galleries, untill you joyn them to the Bullwork; at the same time beginning the sap and the mine. But if you be put to force it by Artillerie, dispose your batterie so that it may commodiously discover the place which you intend to batter; that there be room and libertie for the pieces, loop-holes, munitions, guards and officers; that it be not exposed to the Artillerie of the enemie, or being so, that it be sheltered by traverses and gabions, making it hollow underneath if you fear mines, and retrenching it round about to meet with the sallies of those of the town; furnishing it with planks and pent-houses against their granadoes and stone-pieces; also not approaching too near, to prevent their fireworks and granadoes. Make your batterie furiously and in good order, battering within a fathome of the foundation of the wall, piercing it in divers places; then batter it acrosse to make the wall to totter. The breach being made, you must cause it to be viewed by men chosen to that purpose, each having a head-piece on his head musket proof, and a target with a long rift, and another rift acrosse that. The breach must be accessible

ble and not too right on, capable of many aſſailants, having all the flanks broken both high and low. The ſouldiers which are to give the aſſault muſt aſcend in good order, aſſail furiouſly, fight obſtinately, and they muſt either be repulſed by thoſe of the garriſon, or remain maſters of the place. If they be repulſed by the ſole valour of the enemie, in this caſe (without delay or ſuffering the enemie to gather breath) you muſt charge them again with freſh men and in greater number, ſo often, untill you enter by force; for fighting onely againſt men, it were a ſhame that a greater number of freſh men ſhould not force them.

If ſome retrenchment and new fortification made by the garriſon hath held the aſſailants from paſſing further; in this caſe, if that fortification be weak, it muſt be forced by the ſap and mine, ſcaling ladders, fireworks and granadoes; but if it be ſtrong, you muſt lodge upon the breach, and preſently again begin the ſap and mine and approach, and draw up ſome piece of ordinance on the breach.

Whileſt theſe things above ſaid be in the executing you muſt moleſt the beſieged by all poſſible means you can, as by attempting them by treacherie, making them conſume their munitions in ſhort time and unprofitably, breaking the conveyances of their waters, making feigned batteries, confounding their ſignalls by making the like, ſtirring up cauſes of ſuſpicion amongſt themſelves, often making falſe alarmes,

taking heed that you be not affronted by spies, causing it to be made knowin that you want nothing to bring the siege to an end, galling them with fireworks, granadoes, and artilleries, in their magazines, corps-du-guards, and alarm-places, finally giving no rest to the assailed untill you have either forced them, or be constrained to retreat.

If you carrie the town by force, and remain master of the place, the bootie is to be given to the souldiers (principally to those which made the assault) which are the prisoners and spoils of the enemie, alwayes having regard to the women and children to deal fairly with them.

If it be commodious and advantageous to the vanquisher to preserve the fortresse, he must repair it presently, emptying the moat where it was filled up, laying plain the trenches, throwing down the cavalleroes and batteries without, repairing and making up the breaches, returning the waters into their naturall course if they were turned out, fortifying the place better then formerly it was, if it may be, providing it of a sufficient garrison, of good, valiant, and prudent Governours and Captains, of victuall, armes, manufactures, mechanicall instruments, and Apothecaries drugs.

If it be not advantageous to maintain the fortresse, he must cause it to be demanled, and all the fortification of it to be rased; leaving the houses entire, provided that afterward they may not again fortifie there, nor endammage him.

The usuall practices to assail fortresses.

First you must labour to get a map or plat of the fortresse, and of the champain round about it,

it, and to be informed of their munitions; to know the bigneſſe and capacitie of the fortreſſe, the amplitude and commoditie of the market-places and ſtreets, the ſituations of the magazines, town-houſe, Governours lodging, the rampart and walls, their height, thickneſſe, manner, and form, the capacitie, height and ſituation of their cavalleroes. What Bullworks there be, and whether they be great or ſmall, ſunk into the moat, or very high mounted, commanded or commanding, blunt or ſharp, having eares (or orillons) and caſemats, or not; full or emptie, of a large gorge, or ſtrait; made of earth, or lined with ſtone or brick; mineable or not.

Whether the caſemats be ſeen from the champain, whether they be high or low, ſingle or double one upon the other, whether you can batter them in a ſtraight line, or glancing, and whether they have ditches before them to receive the ruines of the batterie or not.

The breadth and depth of the moat, whether the bottom be of ſtone or earth; whether it be drie or with water in it, either all or in part; whether there be ſallie-ports, whereabout they be, and from whence they can be diſcovered.

Whether the counterſcarp be of meer earth, or with a wall of drie ſtone, or with lime and ſand.

Whether the covert way of the counterſcarp be broad or narrow, well or ill ſheltred and flanked, whether the parapet be raiſed above the plain, or ſunk low; whether it be of tranſported earth, and mingled with old ruines, or meer earth, and whether it be eaſie or hard to be cut, ſapped, or pierced.

If there be ſuburbs belonging to the place, whether

whether you can become master of them at first onset, or whether you must be put to batter them with Artillerie.

Whether there be other works on the outside of the counterscarp, what they be, and how they be made.

Whether the ground round about the town do command it, or whether it be levell champain; or if it be commanded, whether it be mooriſh or drie, whether it be rockie or ſandie, and whether you muſt approach it by traverſes or trenches, and whether they be eaſie or hard to make; whether thereabout be wood to ſerve you for the making of gabions, ſauceidges, and other things: whether there be convenient place to encamp the Armie ſafe from the Artillerie of the town, or whether you may encamp near the town by reaſon of ſome advantage, or by ſheltring your ſelf with traverſes, or whether you ſhall be conſtrained to keep aloof off: Whether there be a river, and what manner of one; whether you can divert it from them or not; whether you may make benefit of it, or are to fear an inundation by it; whether it be wadeable or navigable, at ſometimes, or at all times.

Whether the ſituation of the place be near or farre off from other places on that ſide, whether it be able to get ſuccours or munitions, whether quickly or late, and whether you can hinder it or not, and how. Knowing all theſe things, you muſt be informed of the munitions of the town, the number of the garriſon, how many horſe, what commanders, what ſouldiers, what number of Artillerie, as well great as ſmall; what powder, and how much, what Enginiers, what makers of fire-

works,

works, and what Canoniers; whether they be at unitie within the town, or whether there be divisions.

The Generall being well informed of all these things, being resolved to force the place, because he shall judge it faiseable, he must send his troops of light horsemen to overrun and wast the countrey round about, and to take prisoners, thereby to be informed more certainly of the estate of the place.

He must lead his Armie near to the town, that they may see it in batralia, causing those to be furiously charged which shall sallie out of the town to skirmish, and by this means he shall discover the place, the Bullworks, the moat, the counterscarp, and the other works.

He must make his quarters in such place as is most secured from the canon shot of the town, in the best aire, where he may best have the commoditie of water (and wood if it may be) and the faireſt situation to make the alarm-place.

He is to ordain the quarters of his Armie, and shall cause the line of circumvallation to be well retrenched and guarded, both against releefs, and against those of the town.

He ought not to have so much regard of assaulting the town in that part where it is weakest, as of the commoditie and securitie of his camp and his quarters: and commonly the approaches are made from those places.

The trenches must not begin nearer to the place then harquebus a crock shot, or at least musket shot, running them so that they be not seen straight along by those

those of the town; that they be broad and deep, well flanked and furnished with forts, covering those approaches with hurdles, which are subject to granadoes and stone-pieces.

The place of the Artillerie intended to batter the high flanks and parapets, must be raised so high, that it may command them; but that which should make the breach and beat down the walls must be sunk into the counterscarp, battering the wall between winde and water (if there be any) or at a fathom height above the superficies of the ditch, if it be drie. The first is placed when you begin your trenches of approach, to favour them; the other, when you lay your gallerie to pierce the counterscarp, this batterie makes the breach and beats down the low flanks. Whilest this batterie is a making, you are to pierce the counterscarp, and to have the boats or the wood for the galleries in readinesse, to bring them to the face of the Bullwork, and to go to the assault so soon as you have shot a breach, or to sap and mine the face of the Bullwork, and there to lodge in case you cannot advance further, and to carrie it by force.

You must lodge your musketiers within the trenches, and especially in those which run along by the counterscarp, that so they may beat away all those of the town that might appear, as well on the curtains as casemats.

You must alwayes make the breach on the faces of the Bullworks near their points, unlesse some advantage do incite you to do otherwise.

The entrances to the galleries on the moat must be as farre distant from the flanks as may be, but in such sort as they be not seen but of one flank.

ank. The more galleries there be, the better. cause your granadoes to play into the middle of he Bullworks so continually, that you may hinder he enemie from working there, or there placing heir guard.

If the moat be full of water, you must empty or passe over it by floating bridges (which is angerous) or by galleries, which is not so hazardable.

You may empty it, when there is near hand ome place lower then the ditch, by piercing the ounterscarp, and giving the water a course towards the place; or else you may make a ditch, nd pierce the counterscarp to cause the water to un into it, which is drawn out by pumps. Or lse you are to make floating bridges of barrels or undles of cork. But if the moat be shallow, you ay make galleries with sauceidges. These sauceidges are made of faggots of brush wood, from 5 to 10 foot long, and one foot thick in diameter (all stuffed with rubbish to keep them from floating on the water) then upon these sauceidges you are to lay hurdles or planks.

If the moat be drie and of earth, you must make trenches: usually to that which is drie (if a breach be made) you make neither trench nor gallerie, but you take away all the flanks to passe it securely, and you shelter your self on the sides by hurdles, brush wood, or gabions.

If you force the place by little and little, and that the ditch be of a rock, you must make a traverse within the ditch with sauceidges, or with gabions, or with linnen sacks full of earth.

Having passed the moat, you are to give the assault (if the breach be sufficient or ill retrenched)

ed) or else you are to lodge at the foot of t
Bullwork, and to go to the sap and mine; and a
cording to their effect you must give the assau
advance, or lodge.

If the retrenchment of the assailed be gre
firm, and strong, having gained the Bullwork, y
must there draw up and plant your ordnance, a
make your batterie the most speedy and viole
that may be.

Nothing so much affrighteth the assailed a
furious and expedited batterie, for he hath n
leisure to retrench himself, and knows not wh
to range himself to be under shelter.

That doth much wearie and molest the be
sieged, when they are assaulted at 3 or 4 sever
Bullworks, as 3 or 4 corners of the town; the
are in continuall suspicion, they have their force
disunited, they cannot prevent false alarms, the
labours are very great, and their guards muc
more toilsome and insupportable. Besides tha
every one is diffident of the other guards
breaches, retrenchments, and of their endeavou
to make good defence.

It also much discommodateth the besiegers, fo
their forces are disunited, their quarters are farre
from each other, they are in danger to be hard pu
to it by sallies or by succours, being so scattered.

A.
B.
C.
D.
E.
F.
G.

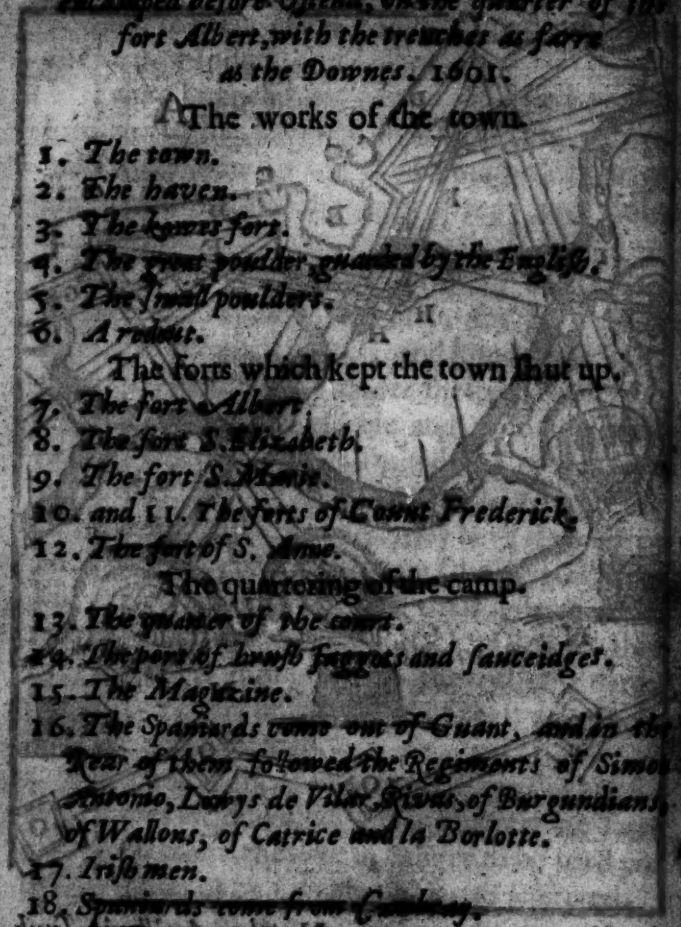
The

The figures following will facilitate the understanding of this chapter.

A. *The town.*
B. *The Bullworks.*
C. *The cavalleroes.*
D. *The rampart.*
E. *The ditch.*
F. *The counterscarp.*
G. *The Galleries of the ditch.*
H. *The Artillerie sunk lowe to beat down the lowe flank.*
I. *The trenches.*
L. *The cavallereet.*
N. *The alarm-place.*
O. *The trenches against succours.*

The

The description of the King of Spains Armie encamped before Ostend, on the quarter of the fort Albert, with the trenches as farre as the Downes. 1601.



The works of the town.

1. The town.
2. The haven.
3. The kowes fort.
4. The great poulder, guarded by the English.
5. The small poulders.
6. A redoubt.

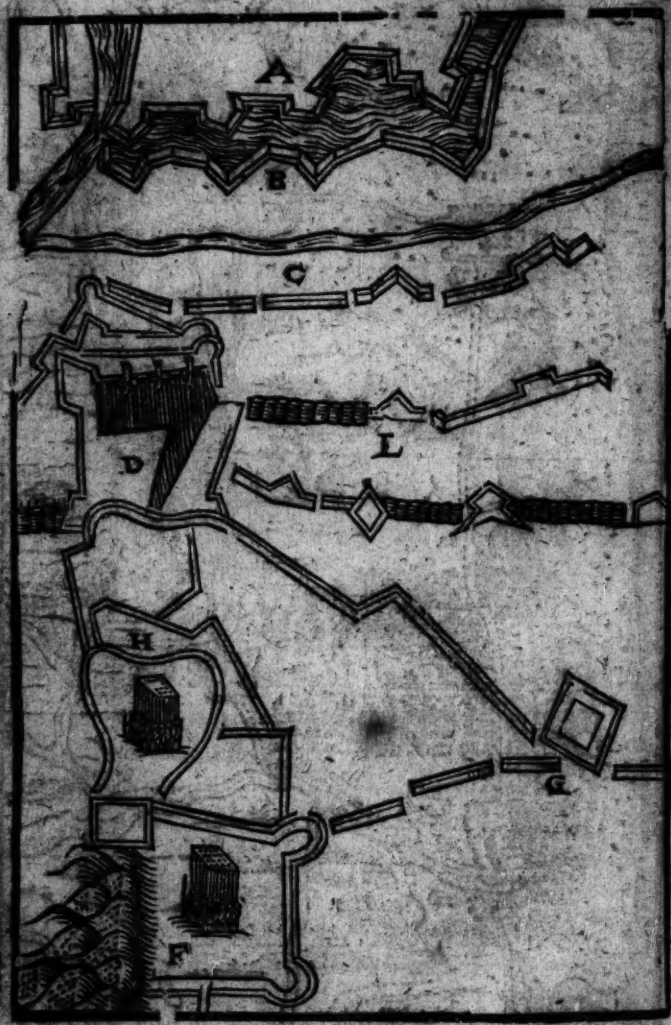
The forts which kept the town shut up.

7. The fort Albert.
8. The fort S. Elizabeth.
9. The fort S. Marie.
10. and 11. The forts of Count Frederick.
12. The fort of S. Anne.

The quartering of the camp.

13. The quarter of the court.
14. The port of brush faggots and sauceidges.
15. The Magazine.
16. The Spaniards came out of Guant, and on the rear of them followed the Regiments of Simon Antonio, Ludys de Vilar Rivas, of Burgundians, of Wallons, of Catrice and la Borlotte.
17. Irish men.
18. Spaniards came from Cambray.
19. Wallons of Count Fresin.
20. The Regiment of the Baron of Rebiecourt.
21. The Regiment of Don Alfonso d'Alvolin.
22. The Regiment of Count Trivulse.
23. The quarter of Cavallrie.
24. The batterie before the alarm-place.
25. The trenches of S. Anne.
26. The forts of Cuinise.

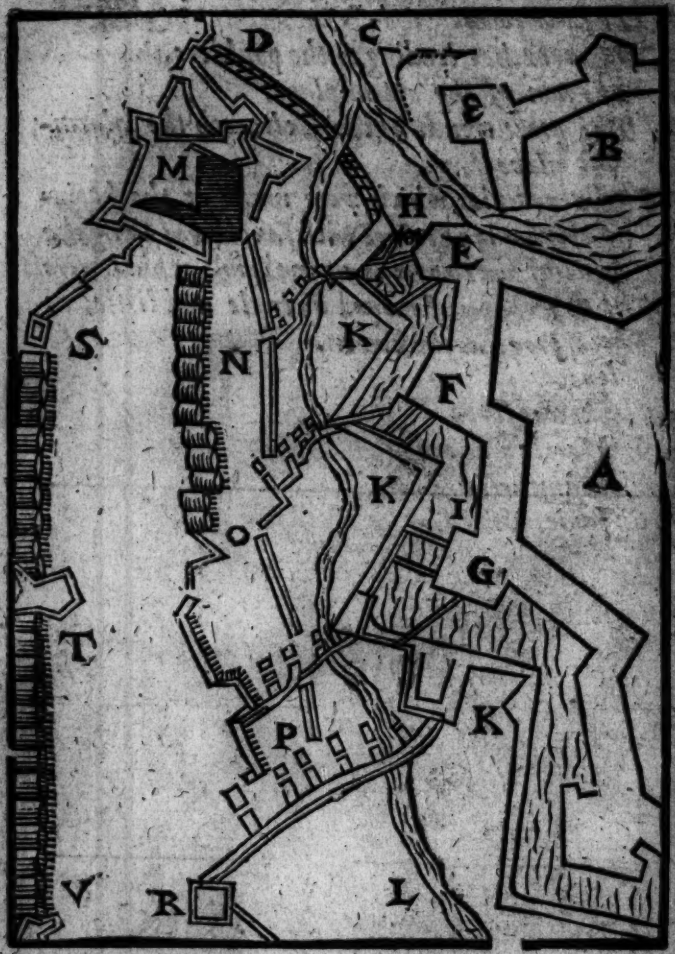
The trenches made before Ostend, from the Downes on that side of the fort Albert, to the platform.



A.

A. The town.
B. The counterſcarp.
C. The channell before the counterſcarp.
D. The platform.
E. The trenches leading to the poulders.
F. The fort of the alarm-place.
G. The great trench which ſheltereth the alarm-place.
H. The galleries which were made at the beginning of the ſiege with ſanceidges along the Downes, to ſeize upon them; which were to be put forward by little and little, as farre as the haven.

The trenches made before Ostend, from the platform to the town.



A. *The new town.*
B. *The old town.*
C. *The old haven.*
D. *The dam.*
E. *The Bullwork of Sandhill.*

E. *The*

E. *The Bullwork of Helwaut.*
F. *The weſt Bullwork.*
G. *The Bullwork of the ponlder.*
H. *The ſluce to keep the water within the moat.*
I. *The moat.*
K. *The counterſcarp.*
L. *The chanell before the counterſcarp, which comes out of the haven.*
M. *The great platforme.*
N. *The approaches of the Spaniards, drawing to the point of the counterſcarp called Porcupine.*
O. *The approaches of the Italians.*
P. *The approaches of the Burgundians and Wallons.*
R. *The kowes fort.*
S. *S. Martin's redout.*
T. *S. Auguſtines redout.*
V. *S. James his redout.*

The ſiege of Rhynberg, by Marquis Spinola, anno 1606.

A. The town. B. The river Rhyne. C. D. The French quarter. E. The Engliſh quarter. F. The Friſons quarter. G. The quagmire. K. The caſtle of the town.

¶ The lines ſhew the works of the town, and the pricks demonſtrate the approaches of the Spaniards.

A. *The town.*
B. *The Castle.*
C. *The trenches of the Prince of Anhalt.*
D. *The French trenches.*
E. *Prince Maurice his trenches.*

Of taking fortresses by famine.

Chap. VIII.

THat is called taking fortresses by famine, when through want of victuall, they are constrained to yeeld themselves to the power of the besieger. You must therefore before you besiege it, be well informed (by means of your intelligencers and spies) of the munitions which be within the place, as well of victuall as drink. You must also know what townsmen and what garrison there be, and by that you are to judge how long their provision will last them, and what means you have to hinder their revictualling. You are to begin the siege a little before harvest, because their provisions will be almost spent, and that they shall have no means to have new; making waste of that about the town which might stand them in stead, and hindring them from water if it be possible. You are to batter down their gates and bridges with your Artillerie, and also you must attempt to break down their mills and magazines, firing them by fire-balls. When you intend to besiege them, you must surprise them on the sudden, least they send out their unprofitable eaters, and attempt to provide themselves. You must have good store of Cavallrie, to be master of the field, and alwayes to send out upon discoverie. The town must be shut up with trenches round about, fortified with many good forts, that so you may hinder their revictualling, and withstand the force of a releef, if it be to be expected: as the Prince *Maurice* did before Grave, *anno* 1602. and before Sluce *anno* 1604.

Grave

Grave beſieged by Prince Maurice.

A. The town. B. The trenches which ſhut it up.
C. The trenches againſt releefs, with redouts round about. G. The trenches of approach.
E. Prince Maurice his quarter; and on the other-ſide of the river Count Erneſts quarter.
D. Count William his quarter.
F. Colonell Vere his quarter.
H. The trenches of the Spaniſh releevers.

Sluce

A. *The town.* B. *The outworks.* C. *The caſtle.*
D. *The Iſle of Caſſant, with the trenches of the Hollanders, marked with pricks in all this figure.*
E. *Prince Maurice his quarter.*
F. *Count William his quarter.*
G. *Count Erneſt his quarter.*
H. *The quarters of Colonell Dort, and Colonell van der Noot.*

Of

Of the defence of fortreſſes againſt the petard, and other ſurpriſes and treacheries.

Chap. IX.

THey which would prevent being ſurpriſed muſt have two conſiderations; the one concerning the attemptours, the other touching the fortreſſe.

Concerning the attemptours, you muſt (if poſſibly you can) have ſpies amongſt them; at leaſt you muſt keep ſentinels as farre diſtant from the fortreſſe as may be, that ſo the Enemie arrive not and be on your jack at unawares and without being diſcovered.

Touching the fortreſſe, you muſt not unfurniſh it to ſupply other places, ſo as that which remaineth be not ſufficient to keep and ſerve it. You muſt appoint the place of rendez-vous for the ſouldiers and citizens in fitting parts of the town, and that they ſtirre not from their ſeverall places without command from the Governour, or Sergeant Major, whatſoever pretence the enemie may make to charge the town in divers parts.

The lodgings of the Governour or Sergeant Major ſhould be about the middle of the town, near ſome ſpacious place, which muſt be the alarm-place of the town.

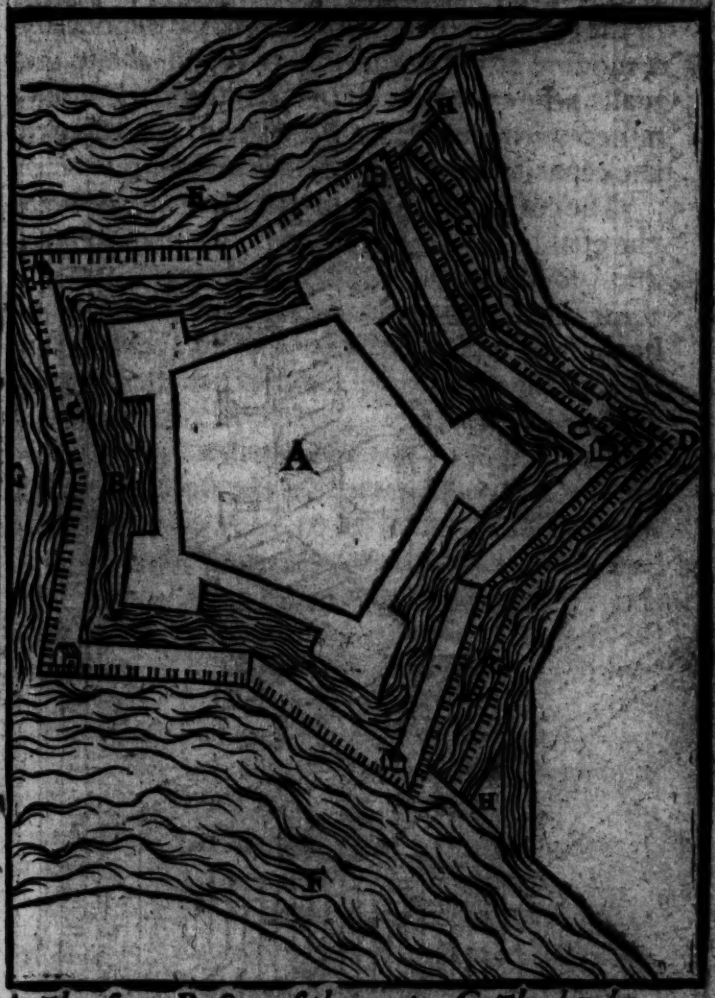
There muſt be iron chains at the corners of the croſſe ſtreets which are before the gates of the town: and you muſt batter down the fronts of the houſes which are juſt over againſt the gates, with canon ſhot: and place one corps-du-guard in the alarm-place, another about the middle

middle of the moat before the bridge, in the manner of a dovehouſe, into which the entrance is by a little draw-bridge; another on every gate of the town, into which none may enter but by a moving plank; and others round about the walls, near enough each to other: and theſe furniſhed with ſouldiers more or leſſe, according to the capacitie of the place, and the danger.

The corps-du-guard of the alarm-place hath the charge to make the rounds, counter-rounds, and grand-round, and to place the ſentinels; which muſt be at ſo near a diſtance, as they may heare and underſtand each others ſpeech, and ſpecially at the corners and the chanell holes, or drains of water.

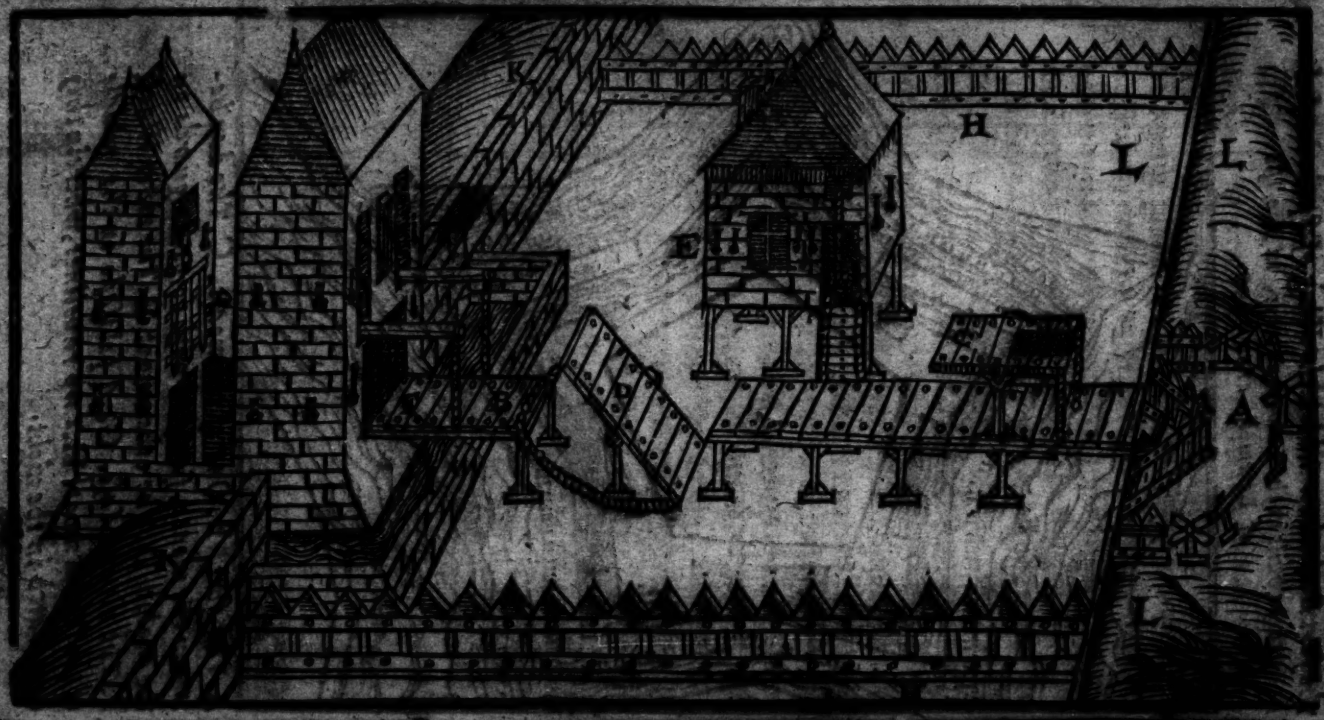
You muſt place ſentinell-perdues without the town, which is the charge of the corps-du-guard which is without before the bridge. If there be a dam of earth between two moats round about the town, there muſt be guards placed in the night, for that is a moſt ſecure remedy againſt ſurpriſes. This dam of earth may be apprehended by the figure following:

The fort S. Andrew which the King of Spain caused to be built in the Low-countreys, in the Isle of Bommell. anno 1599.



A. *The fort.* B. *One of the moats.* C. *The dam between the moats, fortified with corps-du-guards on the angles.* D. *The other moat.* E. *The river Wael.* F. *The river Mase.* G. *A pallisado in the middle of the second moat.* H. *Two ravelines, wherein they kept watch in the night.*

The building of the gates of strong rampierd townes should be after this manner.



A. The paliſado and the barres. B. The bridge dormant. C. The trap-bridge. D. The turning-bridge. It were better to place it within the two towers G. without any other ſtay or prop ſave onely the tampin within the wall. E. The corps-du-guard built within the moat. F. The draw-bridge. G. The portcullice. If the moat be drie, you muſt there make the two paliſadoes H. and ſink the ſmall ditch I. ſo low as the water, or very near it. K. L. The breadth of the moat.

The gates and bridges muſt be flanked on both ſides, and on the upper part with loop-holes, which muſt be large enough to caſt water out at them, alſo pieces of timber, ſtones, granadoes, to quench the fire of a petard, to beat it down, and to kill the petardiers. But not ſo wide that ſurpriſes may be made by them, and there to give the ſcalado. Some place a portcullice there, hung by a rope, which is very fit to beat down the petards.

If you make half moons before the gates of the town, they will be the ſtronger, and the better ſheltred from the champain.

You muſt keep a light piece of Artillerie (but having a great calibre) at the corps-du-guard of the gate, which muſt be charged with cartouches and rubbiſh or ſtones, to turn it towards the place where the enemie ſhall give on.

The moats muſt be deep, having a paliſado in the middle; ſuch as have water need not be full, for that facilitateth the boats for the ſurpriſe.

The curtains and faces of the Bullworks muſt be ſeen and diſcovered by the flanks of the town, even by the low flanks, that ſo the canon may ruine all the ladders which might be attempted to be there raiſed.

The

The curtains must be high and out of danger of scalado, if it may be.

The holes by which the water comes in, or drains of filth passe out, ought to be very strait; built of lime and stone, oblique within the wall, bound with strong grates of iron, having a corps-du-guard or a sentinell on the wall just over against the said grate.

To be well assured of the gates and walls, the way is to appoint good guards, and those diligent, strong, and well placed: those on the walls must be set presently after the shutting of the gates before night; and they must not be dismissed untill day, and untill the sentinell on the steeple hath given the signall by the bell; and that no man knoweth the place where he shall be placed untill the very instant that he entreth the guard.

You may prevent treacheries knowing the cause; for either it proceedeth from the Governour who hath evill entreated, disgraced, or offended the souldier in his reputation, person, or means, and provoked him to an evill disposition; or it proceedeth from the souldier who is ambitious of honour and degrees, or covetous of greater means; or else from the citizens who are tyrannised over by the garrison.

This matter is so tickliſh, that the very suspicion is punishable; but the better way is to dissemble it, and to cause the matter to be further attempted; mean time doubling your rounds, and making extraordinarie counter-rounds.

Of the defence of fortresses against sieges.

Chap. X.

A Fortresse is said to have resisted the enemies forces, when (having well defended it self) it remaineth in its former libertie. To do this, you must draw into the fortresse whatsoever will be usefull for you, and ruine all without which might endammage you; laying flat houses, woods, barns, mills, hollow wayes, gardens, fountains, and whatsoever might batter you and command your defences.

Take good heed that the fortresse be well disposed to resist the assault of the enemie; which is, that the flanks (whether they be high or lowe) may discover, and not be discovered but by imbooking, that is, the canons mouth: that the countermines be well disposed and convenient; that the counterscarp (which is the buckler of the fortresse) be flanked, sheltred, and spacious; that the casemats be secured and well sheltred, spacious, and fit to discover the plain of the opposite bullwork, and within the moat; that the sally-ports be secured, sheltred, lowe, and commodious; that the parapets be of earth or unburnt brick, and that the platforms for the ordinance be made handsomely and even, that so the pieces may easily be moved and removed into their places, spacious for the motions, pioners, and canoniers, and to contain the munitions.

The number of the souldiers of your garrison you are to proportion according to the bigneſse of the place, to the outworks which you would hold, to the labour of the retrenchments which

you ſhall think fit to make, and to the ſallies which ſhall be requiſite.

The Governour muſt be courageous and expert by long practice in aſſaulting and defending, having been beaten to ſuch ſervices.

The ſouldiers ſhould be men of choice, reſolute, ſtrong, obedient, and faithfull.

The quantitie of proviſions as well for victuall and medicines as armes, muſt be meaſured by the time which you ſhall conjecture that the ſiege may continue.

And their qualitie muſt be for the victuall all ſorts of grain, principally pulſe, powdred fleſh, ſalt-fiſh, cheeſe, butter, ſuet, oyl, ſalt, freſh water, wine, beer or cider, vineger, candles, torches, ſhip-pitch, good ſtore of coals, and plenty of wood for the ovens, for the corps-du-guard, and for houſhold uſes.

To tend them which are hurt and ſick there muſt be phyſicians, chirurgeons, & medicaments, as well for contageous diſeaſes as thoſe which are ordinarie, and for wounds; and good ſtore of old linen.

A good quantitie of defenſive weapons, as corſlets, taſſes, morions, headpieces of proof, cuiraſſes, targets both proof and ordinarie: ſtore of armes offenſive, as well ſharp, as pikes, [a] lances, halberts; as fire-weapons, as great and ſmall Artillerie, morters great and ſmall, muskets, harquebuſes a crock, callivers, cartouches, croſſebard ſhot, bullets of iron and lead, lanterns, creſſet-lights, match, powder of a great, mean, and ſmall grain.

[a] *when they were in uſe.*

For the fires as well ſimple as compound; for the ſimple, powder, ſaltpeter or ſalnitre, coal

coal of willow or ſallow, campher, ſulphure, reſine, peter-oyl, linſeed-oyl, ſpike-oyl, tarre, Venice-turpentine, colofonie of Spain, black pitch, Greek pitch, Spaniſh pitch, wax, tallow, varniſh in the ſeed, maſtick, ſal armoniack, common ſalt, quickſilver, vitrioll, *aqua vitæ*, vineger, frankincenſe, wood in abundance, of vine-trees, fir-trees, pines, oſiers, hemp-ſtalks, of laurell, olive, and other fat and drie woods: for compounded fires which are uſed at an aſſault, pitcht ropes, fire-balls, granadoes, fire-wreathes, and fire-trunks.

Good ſtore of maſter founders, armorers, carpenters, maſons, forgers, miners, ſaltpeter-men, powdermakers, millers, cartwrights.

Inſtruments or tools to make carriages for the Artillerie and musket ſtocks; ſome to cut, as hatchets, hooks, ſawes, axes, adzes; to knock, as beetles, hammers, mallets, crows of iron, and handſpikes of wood; to quench the fire, as ladders, buckets of wood and of leather, portable ſoaes or tubs, ſquirts, iron hooks or cromes; to manage the earth, as cutting ſpades, hand-barrows, pickaxes, ſhovels, ladles, mattocks, wheel-barrows, tumbrels, ſcuttle-baskets, maunds.

Wood for the carriages, beds for the ordinance, palliſadoes, barricadoes, bridges, barques, ſauceidges, hurdles, gabions, piles, ſummers, joyſts and ſmall joyſts.

Metals; as copper, tin, lead, iron.

Materials for building; as ſtone, brick, lime, clay.

Good ſtore of linen cloth; cordage, tow, needles and thred.

You muſt agree with your friends without on ſome means to give them advertiſements ordinarily when you ſhall be ſo ſtraitly ſhut up, as you muſt have recourſe to ſignes.

When the enemie ſhews himſelf to begin his enterpriſe and to beſiege you, his Armie being to move divided by reaſon of the diverſitie of occaſions, you muſt labour to diſcommodate him as much as may be.

During the time that he ſhall be buſied in ſhuting up the town, in taking and cutting off the paſſages, it might happen that (in diſtributing of his troops) ſome one may fall into your hands; then lay hold on the time and occaſion, of the ſituation, of the commoditie and favour of your outworks, never abandoning them but upon great conſtraint.

Then in ordering of his quarters you muſt have an eye, that even upon this occaſion you might moleſt him; nevertheleſſe if you conceive that by ſuffering him to go on ſecurely, you ſhould have means afterward to offend him to greater effect, you may defer it untill then: for thoſe diſcommodities which ſucceed with loſſe of that which one poſſeſſeth, bring double damage. Nevertheleſſe you muſt take great heed not to ſtay ſo long as that he be fortified, whether it be in his trenches, quarters, or lodging of his munitions and Artillerie.

When he ſhall begin his trenches, and make platformes to plant his ordinance to batter you, hinder him and moleſt him with all your power (which you ſhall hardly do if he hath earth and wood) obſerve the imperfections of his works, whether they be ſtraitned or ſcant, imbocked

not

not well ſheltred, ill flanked, ill conducted, ill guarded, and endeavour to make benefite thereof.

Draw him on by falſe appearances to aſſault you where you are ſtrongeſt, he taking you to be there weakeſt, and this by means of aſſured ſpies, under the name of fugitives or ſuch as come to him for refuge, or letters artificially written and ſuffered to be intercepted.

Compell your enemie to begin his batteries and trenches the furtheſt off from the town that poſſibly you can, by ſome retrenchments made without, defended by your half moons, counterſcarps and ramparts, made in ſuch manner as (the enemie taking them) they may not ſtand him in any ſtead againſt you; therefore all the trenches which you make without the counterſcarp muſt open all along to the view of the flanks of the ravelines or of the town, as you may ſee in the figures following.

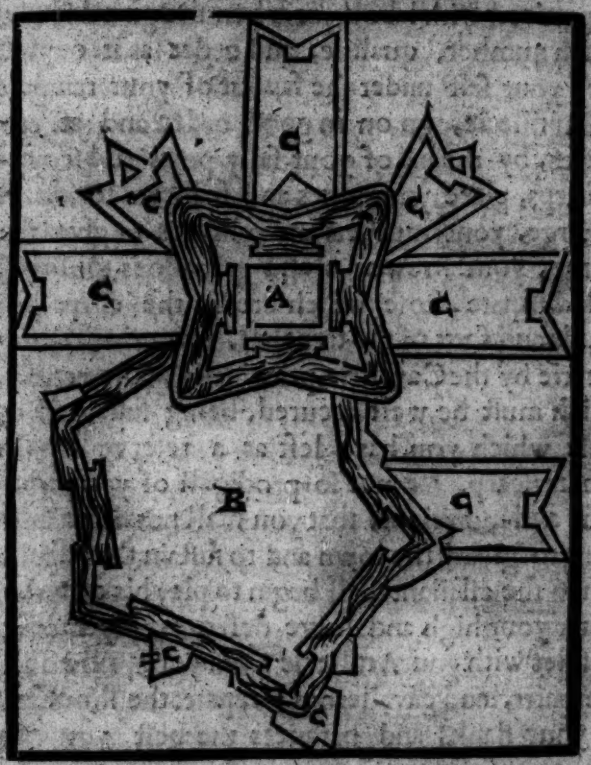
The plat of Geneva. 1611.

A. The town.
B. S. Gervaſe.
C. The lake.
D. The river Rhoſne.
E. The Iſle and the bridges.

The lines repreſent the fortifications made, and the pricks ſhew the deſignes of thoſe which are to be made.

The

The plat of Gulick, fortified by Prince Maurice after the taking of it.



A. *The castle.*
B. *The town.*
C. *The retrenchment made about the town.*

For your ſallies, take good heed to the time, whether it be fitting or contrarie; to the occaſion, as when the enemie is wet, ſtiff with cold, ſleepy, tired with labour, or when the guard is not in ſuch number, qualitie, and order as it ought. Keep your ſelf under the favour of your rampart and Artillerie, go on in good order and at unawares, by means of your ſally-ports and counterſcarps, place your pikes and halberts to ſuſtain a charge, your muskets and callivers to give the charge, your fireworks and granadoes to break and diſſipate thoſe which are in the corps-du-guards and forts of the trenches, favouring the Infanterie by the Cavallrie, principally at the retreat, which muſt be well ſecured, being ſuſtained by thoſe which you have left as a reſerve on the counterſcarp. Be not ſo prodigall of your ſouldiers and munitions, that you ſhall not have ſufficient to guard the town and to ſuſtain the aſſaults. When the aſſailant ſhall begin to play his canon to batter your high and lowe defences, ply him on all ſides with your Artillerie from your Bullworks, ramparts, and cavalleroes; repair the ſhoulders of your flanks and parapets the beſt you can. Make new places of retreat and new flanks, principally concealed ones.

When he ſhall pierce your counterſcarp or open your moat, he will at the ſame time batter your walls; if he have forgotten nothing of that diligence which is requiſite, you ſhall hardly hinder nor offend him. But if he do miſtake, ſeize you on the occaſion, and have a watchfull eye, as if his Artillerie be diſcovered, you ſhall endeavour to diſmount his pieces, to kill his canoniers, to ſpoil his munitions; if it be ill fortified, make

a furious ſally upon it, to diſmount and nail it up, making uſe of your Artillerie and muskets.

If the aſſailant be well experienced, whileſt he is battering you to make a breach, he will batter all the low flanks which flank the place where he intendeth to give the aſſault (the high flanks being already taken off before the Artillerie was brought on the counterſcarp) but not before he become maſter of the moat, if it be drie, or of the counterſcarp if the moat be full of water; making the platform for the Artillerie upon the gallerie which pierceth the counterſcarp to enter the moat, keeping the boats and galleries to paſſe over the moat ready to lay ſuddenly when the time and occaſion ſhall be fit to give the aſſault; or elſe to plant them during the batterie under favour of the Artillerie and musket ſhot. Now, againſt all this, an expert Governour will keep his flanks hidden, which being opened unawares will much endammage the aſſailant, who (having made a breach) will cauſe it to be viewed by armed men (on which you muſt not ſpare your faulconet ſhot, nor that of the harquebus a crock) and ordinarily they are of the moſt able and valiant men.

The breach being viewed, he will come to the aſſault, for which you muſt order your ſelf to give combat and reſiſt him, either by handblows or retrenching your ſelf, or both; by handblows, ſo ſoon as he ſhall begin to ſhew himſelf and become a mark for you, beginning to mount up to the breach, repulſing him by armed men, which you ſhall have ſelected before the aſſault, being reſolute and hardy, which muſt headſtrongly withſtand the firſt furie; which will either cauſe the enemie to retreat, or at leaſt you ſhall notably

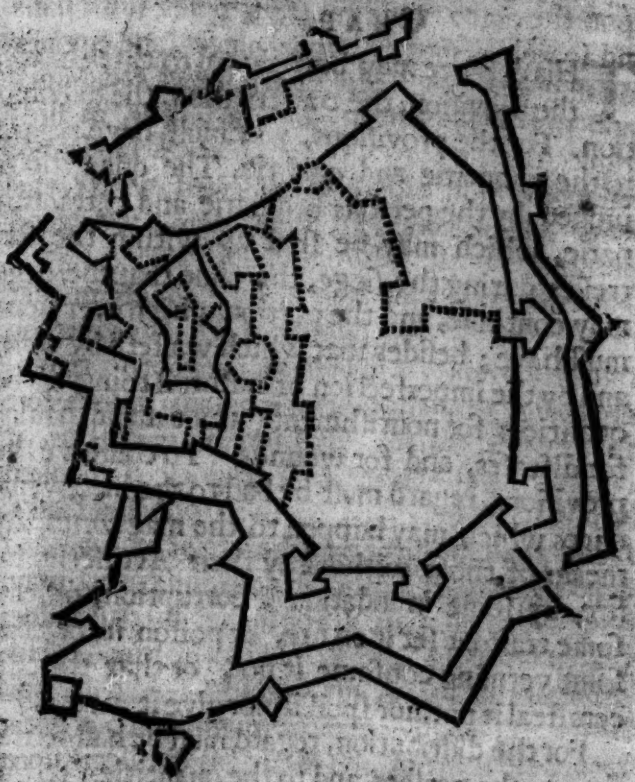
miſchief

miſchief him. You are to make uſe of engines and inſtruments fitting to hinder the enemie from climbing up to the breach, as calthrops ſtrewed upon the place, rowling leiſts, beſet with nails and ſquibbes, morters, ſtone-pieces, and engines to caſt granadoes, fireballs, cartouches, &c. Mines muſt not be forgotten, nor fire-works, as fire-trunks, pots, moveable mines, fire-garlands, &c. having carefull regard how, when, where, and from whence you caſt them, doing it to good purpoſe.

If the enemie aſſault you by degrees, or that he make his batterie ſo leiſurely that he give you time to retrench your ſelf, make your retrenchment well flanked and commodious, in ſuch ſort that by it you may reſiſt him. To effect this, it ought to be difficult to be expugned, ſo flanked as it may be defended on the front and flanks, facile for ſallies, having before it a broad and deep moat with a counterſcarp and covert way, having the rampart ſtrengthened by palliſadoes which go along the outſide of the line, encloſures of the camp, and gabions; And by this means you ſhall draw the buſineſſe to a great length: for he muſt draw up his Artillerie upon the breach, after that he be lodged upon it, he muſt make a new batterie, a new overture, new ſaps, mines, and chambers, which will give you leiſure to make new retrenchments, and to gain and prolong the time, as the Hollanders did at Oſtend, and in many other places.

The

The Plat of Oſtend, with the retrenchments. 1604.



The lines repreſent the fortreſſes of the town, and the pricks the retrenchments.

Of the defence of fortreſſes againſt famine.

Chap. XI.

THis defence may be reduced to three heads, the proviſion, the conſervation, the diſtribution. For the proviſions, you muſt have regard to the quantitie and qualitie. The quantitie is judged by the perſons ordinarie and extraordinarie, which may be ſhut up within the fortreſſes during the ſiege, the time that the ſiege may continue, and the portion which every one muſt have; beſides that which waſteth by time, and by the imperfection of naturall things. The qualitie is for nouriſhment (as meat and drink) for diſeaſes, and for wounds. To conſerve the proviſions, regard muſt be had to the inconveniences which may happen to the magazines, by means of thoſe without by their Artillerie, by fire, by ſome inundation or corruption, or leaſt ſome traitour ſet it on fire, or poiſon it, or that ſome vermine conſume it not, or that the officers ſteal it not, nor ſpoil it, nor give it away.

For the diſtribution, regard muſt be had to the time, to the perſons, and to the quantitie. To the time, when you ſhould begin to open the publick proviſions, which is, when the private are conſumed, knowing the perſons and munitions of every family. To the perſons, who for the difference of their condition muſt be diverſly dealt with, according to their eſtate and qualitie. To the quantitie, which muſt be meaſured by that which every day one perſon ſhall neceſſarily require for nouriſhment; having regard to their ſex, age, exerciſe, and diſpoſition.

Of

Of releeving places beſieged.

Chap. XII.

IN the releeving of fortreſſes, you muſt conſider the means to effect it, or to hinder it.

To effect it, either openly or ſecretly, having regard to the place, to the enemies retrenchments, and to the releef.

To the ſituation of the place, which may be commodious and facile by reaſon of the open champains and freedome from impeachments; or diſcommodious and difficult, by reaſon of bogs, rivers, woods, and mountains.

To the enemies forts which are about it, as defences by palliſadoes, gabions, moats, trenches, and redouts; who may either remain within his trenches, or go forth into the champain to beat off the releef.

For the releef, it muſt be guarded by a good convoy, becauſe otherwiſe the enemie might charge and rout it, pillaging the munitions, hindring the return, cutting off their way, being the ſtronger. You muſt know the means, the time, the ſtratagems, and the paſſages by which the releef may be conducted and introducted into the place, carrying with you ſufficient proviſion of things neceſſarie, for the victuall, for the armes, and for all that concerneth the furtherance and execution of the releef, as pioners, boats, barks, and other engines, to paſſe rivers and marſhes.

You muſt make good choice of the troop and groſſe of ſouldiers which ſhould execute the releef, as, that the ſouldiers be well ſelected out of the ancienteſt, and that the officers be able and willing courageouſly to perform all that is to be done,

done, to execute the enterprise infallibly, or to retreat honourably, or there to sell their lives at a dear rate.

A releef may be hindred, either by attending it within the trenches, or else by advancing towards them to give them battaile, and to oppose their passage, abandoning the siege to go with all the forces, or with part of the Armie, leaving (in the mean time) the siege maintained, and the trenches manned.

Of French Artillerie.

Of foundings, mixtures, and measures of ordinance.

Chap. XIII.

IN the founding of ordinance, to 100 pound of fine copper, you are to adde 20 pound of bell-metall; or for want of bell-metall, adde 10 pound of soft tin.

Or else, to 100 pound of copper, adde 10 pound of latin, and 8 pound of soft tin.

In the founding of ordinance, in regard of the waste, in every 6 pound of metall you are to adde 1 pound over weight.

A singular care must be taken of the melting and mixing of metals, for the inward neatnesse of the pieces. To this end the material must be good, so must the earth for the moules; being well beaten and through wrought with hair and flocks. The moules, models and cilinders well pointed and greased with good tallow, and bound with hoops of iron, well and throughly nealed, well placed and set. The trunions must be so justly

ly placed, as the piece may be as in ballance on them, weighing almoſt equally forwards to her muzzel, as backwards towards her breech, that ſo a canonier may without trouble mount or imbaſe her.

The piece muſt be ſtrong about the trunions, for thereabout ſhe ſuffereth the greateſt force, and firſt moving.

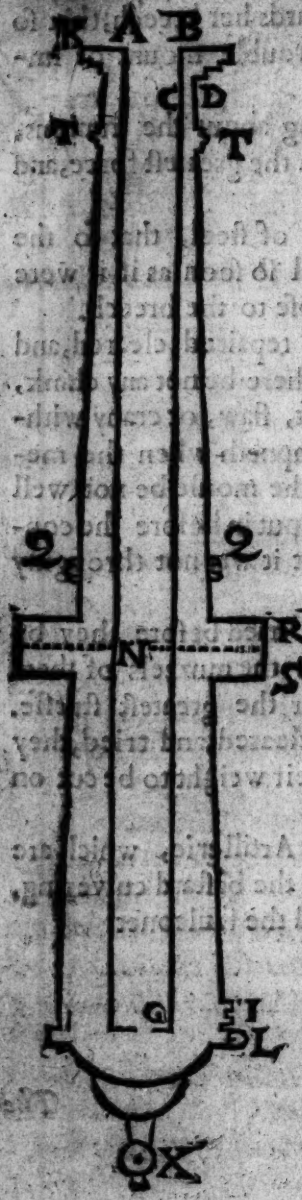
The touchhole muſt be of ſteel, that ſo the piece be not made unuſefull ſo ſoon as if it were of metall, and muſt be cloſe to the breech.

The pieces muſt be well repaired, cleared, and tried, having regard that there be not any chink, hole, hony-comb, crack, rift, flaw, or crany within them; which uſually hapneth when the metall is run too cold, or that the moule be not well nealed, or that the tin was put in before the copper was well melted, or that it was not throughly mixed or incorporated.

The pieces ought to be tried before they be mounted on their carriages, the muzzels of them mounted, for ſo they bear the greateſt ſtreſſe. When they be ſo repaired, cleared, and tried, they are to be weighed, and their weight to be cut on their breech.

There be ſix calibres of Artillerie, which are the canon, the culvering, the baſtard culvering, the minion, the faulcon, and the faulconet.

The names of the parts of a canon.



A. B. *The diameter of the muzzel, concave, or bore of the piece.*

C. D. *The neck.*

G. I. *The thickneſſe of the metall at the touch-hole or chamber.*

G. B. *The length of the concave or cilinder of the piece.*

R. S. *The diameter or thickneſſe of the trunnion.*

K. *The muzzel ring or freeſe.*

N. A. *The vacant cilinder from the charge, for the guide of the ſhot.*

N. X. *The chamber.*

L. *The baſe ring, and the ſight upon it.*

G. X. *The breech.*

X. *The caſcabell or pummell.*

T. *The aſtragall or coronice ring.*

Q. *The reinforced ring.*

I *The touch-hole.*

Of

Of weights.

The pound (mark weight) consisteth of two marks, the mark of eight ounces, the ounce of eight drams, the dram three penie weight, the penie weight foure and twenty grains.

This weight cannot be Troy weight, for that hath but 20 penie weight in the ounce, and this hath 24.

Of measure.

The fathom containeth 6 foot, the foot 12 inches, the inch 12 lines.

But the custome in England is to divide the inch into eight equall parts, which I follow.

The measures of the parts of a canon, and the use thereof.

The diameter of the bore of the canon is six inches and one sixt part of an inch.

The diameter of the bullet six inches.

The vent or aire for the bullet to play one sixt part.

The bullet weigheth 33 pound and one third part, which is called the Calibre of the canon.

The metall is two inches thick at the neck, and six at the breech.

The cilinder or concave is nine foot long, and equally wide in each part of it.

The whole canon is somewhat longer then ten foot.

Our English founding of ordinance differeth from the French proportions, as appeareth in M. Norton's Gunner, page 53.

The diameter of the trunion is six inches.

The vacant cilinder or guide is five foot and an half.

The reinforced ring is distant from the muzzell ring foure foot and a half.

The thickneſſe or height of the muzzell ring is five inches.

The coronice ring is within half a foot of the muzzell ring.

The ſight of iron is placed on the flat baſe ring.

The metall of the piece weigheth about 5600 pound.

Her carriage for the field is fourteen foot long, and the axletree ſeven.

The canon mounted on her field carriage is almoſt nineteen foot long.

The powder for her charge weigheth eighteen or twenty pound.

The ordinarie obſervation for all pieces is, That the charge of powder be at leaſt the moytie of the weight of the bullet, and ſo to two third parts, which is rather better.

The canon may be laden ten times in an houre, and 120 times a day.

She ſhoots point blank almoſt ſix hundred paces.

a Obſerve that paces are here underſtood to be onely ſteps: otherwiſe it were impoſſible.

Her platform muſt be fifteen foot broad, and 20 foot long, for her reverſe. The formoſt ten foot are to be of plank, and the reſt of hurdles, if plank be wanting.

There muſt be twenty horſes to draw a canon. A waggon drawn by foure horſes carrieth a thouſand or twelve hundred pound weight; it is about ten or twelve foot long in the body, and

the

the waggon with the horſes about fifty foot; and their breadth about the axletree is [b] ſix foot.

One waggon carrieth three and thirty canon bullets.

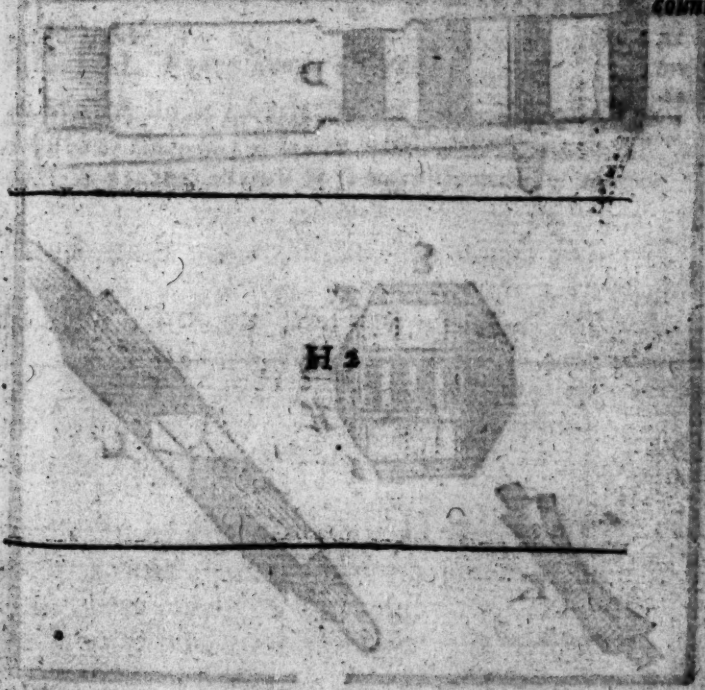
There muſt be ſix waggons, and foure and twenty horſes to carrie the munitions ſufficient for a canon to play one whole day, namely, one hundred and twenty bullets, and two thouſand and foure hundred pound of powder.

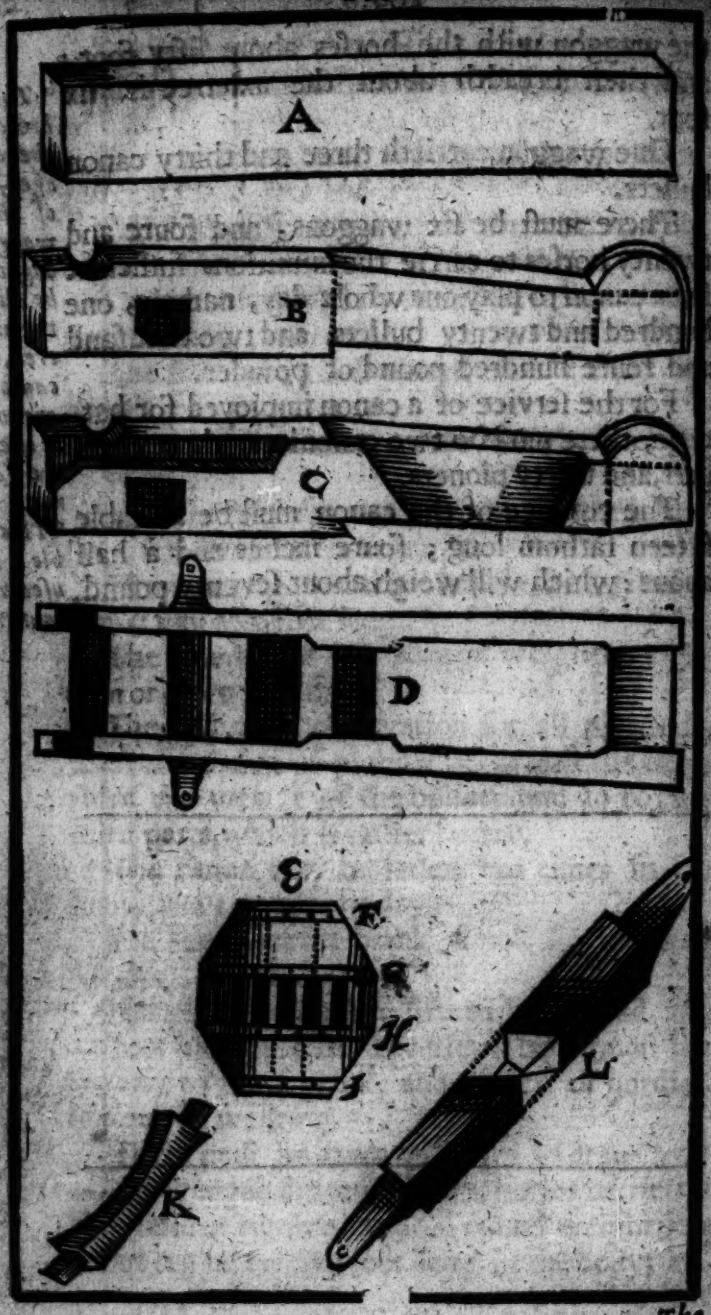
For the ſervice of a canon imployed for batterie, there muſt be two canoniers, three chargers, and thirty pioners.

The cordage of the canon muſt be a [c] cable fifteen fathom long, foure inches and a half about: which will weigh about ſeventy pound.

[b] *The breadth of the carriages, and of the waggons ought to be alike at the axletree, becauſe they are to go in one and the ſame rut.*

[c] *This cable is not uſed in all countreys.*





The

The names of the parts of the carriages and wheels for the Artillerie.

A. A plank for the cheeks or side of the carriage 14 foot and an half long, one foot and an half thick, and one foot eight inches broad for the canon.

B. The outside of the cheek.

C. The inside of the cheek.

D. The carriage being * 13 inches broad within the work at the head, and 18 at the tail.

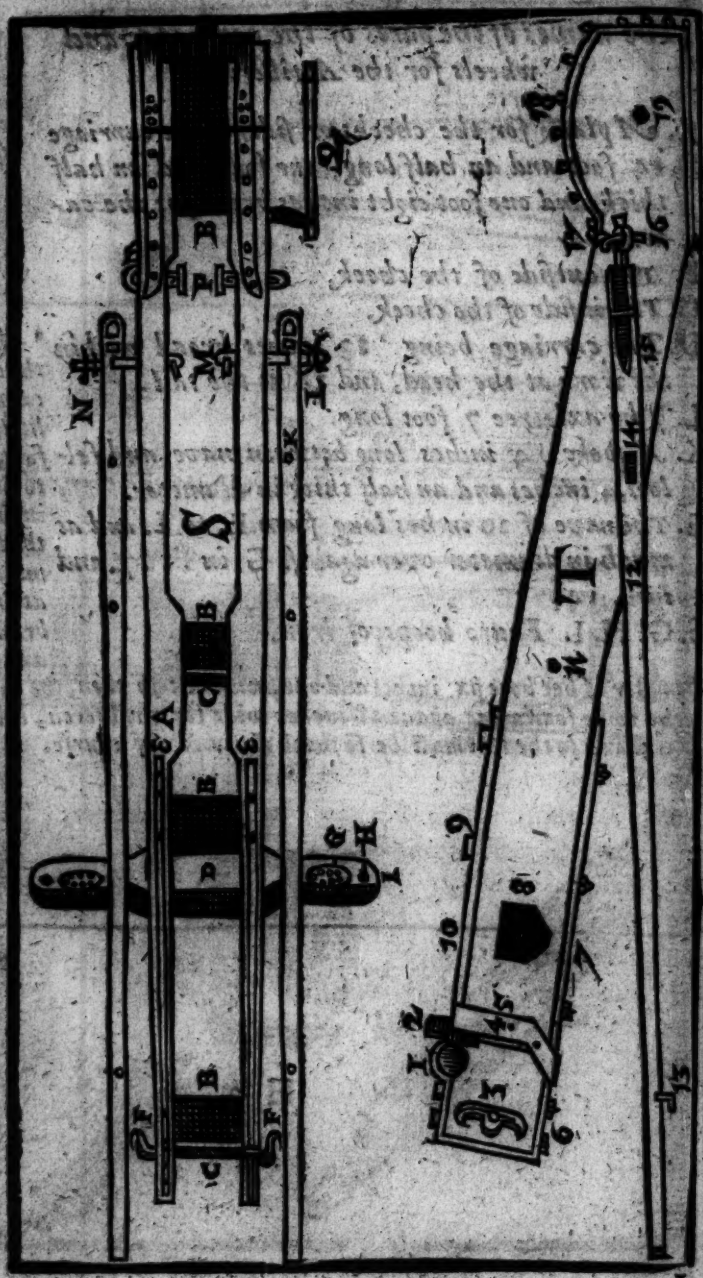
L. The axletree 7 foot long.

K. A spoke 14 inches long between nave and felloes, 4 inches and an half thick in diameter.

E. The nave of 20 inches long from E. to I. and as much in diameter over against G. in F. 17. and in I. 14.

F. G. H. I. Foure hoops of iron.

* Note that the canon, a little before, is said to be 6 inches thick of metall at her breech, and the diameter of her bore six inches and one foot part: so then, the carriage ought to be somewhat above 18 inches wide for the breech, bed and coins; and so the tail must be so much the wider of course.



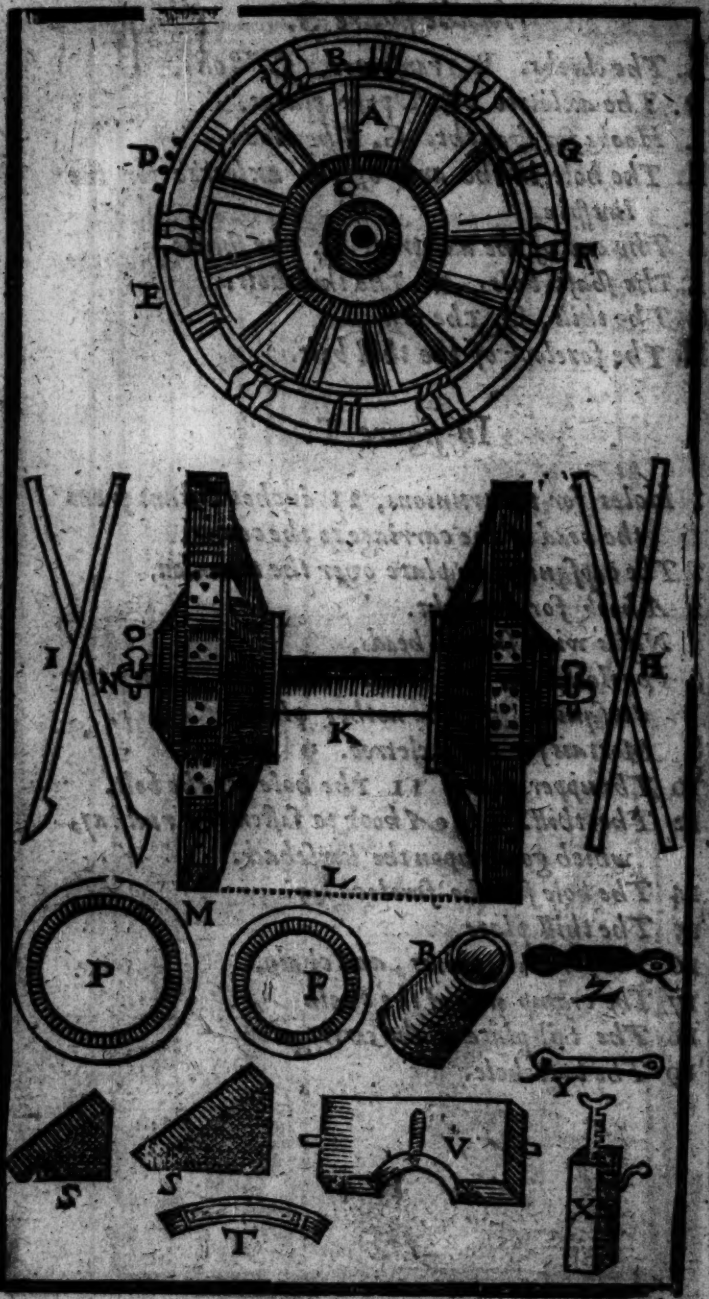
In

In the figure S.

A. *The cheeks.* B. *Tranſomes.* C. *Bolts.*
D. *The axletree.* E. *Upper plates.*
F. *Hooks for draught.* G. *The clowt.*
H. *The hole in the arm of the axletree for the linſpin.*
I. *The end of the axletree.* K. *The ſhafts.*
L. *The ſhaft-bolts.* M. *The thill-bolt.*
O. *The thill.* Q. *The reſt.*
N. *The forelock of the thill bolt.*

In figure T.

1 *Holes for the trunions, 21 inches diſtant from the head of the carriage to the center.*
2 *The capſquire, or plate over the trunnion.*
3 *A hook for draught.*
4 *Nails with ſmooth heads.*
6 *Forelocks for the bolts that pin down the capſquire.* 7 *The nether plate.*
8 *Mortais for the axletree.* 9 *Bolts.*
10 *The upper plate.* 11 *The hole for the bolt.*
12 *The thill.* 13 *A hook to faſten the rudſtay, which goeth upon the horſeback.*
14 *The hole for the forelock key.*
15 *The thill plate.*
16 *The forelock, pinnes, and chain.*
17 *The cramp-iron of the chain.*
18 *The tail-plate of the carriage.*
19 *The bolt-hole.*



The

The wheels are fiue foot high being ſhod.

A. *Spokes.*
B. *Felloes.*
C. *The nave.*
D. *Nails.*
E. *The plates for the ſhoing or tire of the wheels.*
F. *The barres ouer the felloes to ſtrengthen them.*
G. *The ſtirrops.*
H. *Leauers or handſpikes.*
I. *Crow leauers.*
K. *The axletree.*
L. *The diſtance betweene the wheels.*
M. *The rut of the wheel.*
N. *The end of the axletree.*
O. *The linſpin.*
P. *The great and ſmall hoops.*
R. *The baſſe of iron for the nave.*
S. *The great and little coins.*
T. *The dowlidge of the wheel.*
V. *The ſight rule, to be placed vpon the baſe-ring.*
X. *An handſcrue.*
Y. *A bar, to be placed ouer the felloes.*
Z. *A ſtirrop.*

L
M
N
K
C
B
A
D
E
F
G
H

A. *A canon mounted.*
B. *The cable.*
C. *The head of the ladle and ſponge.*
D. *Thongs to tie the leavers, ladle, and ſponge.*
E. *The ſtaffe of the ſponge.*
F. *The ſtaff of the ladle.*
G. *The ſponge.*
H. } *The ladle of braſſe.*
I. }
K. *The budge-barrell.*
L. *A caſque of corn-powder.*
M. *A caſque of fine powder.*
N. *A barrell of priming-powder.*

Of the great culvering.

The diameter of her bore is foure inches and five sixt parts.

The diameter of her bullet, foure inches, and two third parts.

The bullet weigheth 15 pound and a quarter.

Her metall at her neck is one inch thick and three fourth parts, and at her chamber foure inches and five sixt parts.

Her cilinder is nine foot & foure inches long.

From the center of the trunions to the touch-hole is three foot ten inches.

The vent or aire for the bullet to play is one sixt part.

Her charge of powder is ten pound weight.

She shoots point blank * 800 paces.

She may be laden ten times in an houre, and 120 times in a day.

Her metall weighs about 4000 pound weight.

She requireth 17 horses to draw her.

A waggon carrieth 66 of her bullets.

She must have 120 bullets a day, and 1200 pound of powder; and for the carriage of her munitions for a day, three waggons and twelve horses, 24 pioners, two ordinarie canoniers, and two extraordinarie.

The cordage of a great culvering is a cable of twelve fathom long, and foure inches about, weighing about 55 pound.

** Understand paces as hath been observed before for the cannon.*

Of the bastard culvering.

The diameter of her bore is three inches and three fourth parts.

The diameter of her bullet three inches and two third parts.

The

The vent or aire for the bullet to play one twelfth part.

The metall at her neck is one inch and one fourth part thick, and at her chamber three inches and three fourth parts.

Her cilinder is eight foot seaven inches in length.

From the centre of her trunions to her touch-hole is three foot six inches.

Her bullet weighs seaven pound and a quarter, and her powder five pound.

She shoots point blanck [b] 1000 paces.

[b] *Observe as before.*

She may be laden 140 times in a day, which is about twelve bullets in an houre.

Her metall weigheth about 2500 pound.

She must have thirteen horses to draw her.

A waggon carrieth 140 of her bullets.

Her munitions for her to play one whole day, are 140 bullets, 700 pound of powder.

She must have two waggons and eight horses to carrie her munitions for one day, twelve ploners, and two canoniers.

The cordage of the bastard culvering is a cable of [c] six fathom long, and three inches and an half thick, weighing about 45 pound.

[c] *Here must be a mistake: for if the cable for the great culvering of 12 fathom long, and 4 inches thick, weigh but 55 pound, how can this, being but 6 fathom long, and 3 inches and a half thick, weigh 45 pound? I conceive the mistake to be in the length of the cable, which should be longer, rather then 6 fathom.*

Of the minion.

The diameter of her bore is two inches and three fourth parts.

The diameter of her bullet is two inches and two third parts.

The

The vent for the bullet to play is one twelfth part.

Her metall is one inch thick at her neck.

At her breech two inches and three fourth parts.

Her cilinder is eight foot long.

From the center of her trunions to her touch-hole is three foot five inches.

Her bullet weighs three pound and an half, and her charge of powder two pound and an half.

She shoots point blanck 1400 paces.

She shoots 160 bullets a day, which is about thirteen each houre.

Her metall weighs about 1350 pound.

She must have nine horses to draw her.

A waggon carrieth 226 of her bullets.

She must have 160 bullets, and 400 pound of powder for a dayes batterie.

One waggon carrieth her munitions for one day.

She is served with six pioners, and two canoniers.

Of the faulcon.

The faulcon may be laden fifteen times in an houre, which is 180 times a day.

Her bullet weighs one pound and an half, the charge of her powder one pound, and her metall eight hundred pound.

She must have five horses to draw her.

One waggon carrieth her munitions for two dayes.

She is served with foure pioners, and one canonier.

Of

Of the faulconet.

The faulconet may be laden about 250 times a day, which is about twenty times each houre.

Her bullet weigheth three quarters of a pound, and her charge of powder an half pound, her metall five hundred pound.

One waggon carrieth her munitions for 3 dayes.

One horse draweth her.[a]

She is served with 4 pioners and one canonier.

[a] *If the faulcon which weigheth eight hundred pound, requireth five horses to draw her, the faulconet weighing five hundred pound, will require three horses.*

Of the harquebus a croc.

The harquebus a croc may be laden 300 times a day, which is 25 times each houre.

Her bullet weigheth 3 ounces, and her charge of powder 2 ounces.

One waggon carrieth 14 hurdles of 10 foot long and 6 foot broad. It may carrie 12 dosen of pikes, which are usually about 18 foot long. It carrieth 300 shovels, pickaxes, or spades.

These waggons are made with boards on the sides and bottome, like tumbrels, to pack up those instruments within them, and also many other smaller ones, as sawes, chopping-hooks, hatchets, hammers, chizzels, crows of iron.

It may carry 10 pieces of a bridge of bul-rushes. These pieces are made after this manner, every piece hath 10 bundles of cane-reeds bound together with cords as much as is possible, and then well sewed within a course cloath; so as they become 10 sacks full of reeds; being a foot in diameter, and 6 foot in length. They are fastned with good cords upon a hurdle of 10 foot long, and 6 foot broad.

How

Before the Artillerie do march, certain commissaries, canoniers, the waggon master, and certain pioners must go before to accommodate the wayes.

The small pieces must march before, then all the greater ones, then three wagons; whereof the first is to carrie a barrell of grease, and all the smiths tools in a cheft. The second, all the wheelwrights and carpenters tools, the gins the leavers and handscrue to raise the pieces. The third is to carrie the anvile, the bellows, and other smiths tools. Then follow the conductours and canoniers to guard them.

Then the waggons laden with bullets, powder, and other munitions.

All the canoniers must accompanie the ordinance, every one near his own piece.

The Artillerie and munitions must be quartered in a place sufficiently spacious, which must alwayes have the front towards the enemie.

Round about the Artillerie and munitions there must be a place large enough to contain the guards.

CHAP. XIIII.

Of the ſouldier.

HE muſt be armed with ſuch armes as his captain ſhall appoint him: for he knoweth better then himſelf what armes are moſt fit for him.

He muſt ſhew himſelf deſirous to make manifeſtation of his courage, but muſt not therefore at any time go out on any action without the expreſſe command of his chiefs, making it appear that he is diſcreet as well as valorous.

His eating and ſleeping muſt be regulated according to his leiſure, not according to his will.

He muſt not be a mutinier, neither muſt he change his companie without great reaſon, nor depart without leave obtained and authenticall certificate of his faithfull ſervice. Good ſpirits are not known but upon occaſions, which offer not themſelves every day: beſides that, a private ſouldier which deſireth to attain to ſome place of command, hath need of a long time, to gain experience ſufficient to render him worthie, and to make his abilities known to ſuch as can advance him.

He muſt ſtudy to know the uſe and managing of his armes, the duties of a ſouldier, the motions of companies, his marching, his quartering in the field, to make his guards, and place his ſentinels, to underſtand the beats of the drum; to make a guard for his ſuperiours.

The ſouldier ſhould not enroll himſelf under a captain of mean reputation, or one that is cove-

rous, leſt he looſe his labour and time, to prevent changing. So alſo a Captain ought not to receive a ſouldier without knowing him, leſt he happen on ſome mutinier, cōward, feeble or diſeaſed perſon.

Of the dutie of the Lanſpaſſadoes and Appointees.

They are to eaſe the Corporals, and to be as their Lieutenants and aides in time of danger: they are alſo rounders and ſentinell-perdues, in caſes of neceſſitie, but not otherwiſe.

Of the Corporall.

He hath the command of his ſquadron, and is to teach them whatſoever is neceſſarie for a ſouldier to know and do. He is to lodge them by camerādoes, to prevent quarrels and diſorders by admoniſhing them, or acquainting the Captain therewith; for to chaſtiſe them he hath no power, unleſſe it be by vexing them with ſtanding ſentinell. He muſt have a liſt of his ſouldiers, and muſt give notice to his Sergeant when a ſouldiers name is croſſed out. He is to diſtribute the victuall, bullets, match, and powder to the ſouldiers of his ſquadron; to know which are the moſt experienced of them, that ſo they may be imployed in the watches and actions of greateſt importance; to have an eye to their lives and manners, to take care of the baggage and money of ſuch as are hurt and ſick, cauſing every man to husband his pay taken at muſters. Being on the guard, he muſt be vigilant and ſuſpicious; he muſt place the ſentinels where the Sergeant major or his Captain ſhall have directed him: he muſt releeve them him-

himself, and must send a Lanspassado, or one whom his Captain shall appoint, whereof he is alwayes to have two, to visit them. He must attend his rounds and counter-rounds before his corps-du-guard, which must give him the word: and were it the Generall of the Armie himself, the sentinels ought not to suffer him nor any person to approach them, without charging their pike or presenting their musket, the match cocked; and if it be the grand-watch or other troop, to stay them untill the Corporall come; who must never go alone out of his corps-du-guard, but with three or foure to accompanie him. He must advertise the sentinels how to demean themselves upon the discoverie of the enemie, either to give an alarm, or else to give notice without making any noise. The sentinels must never remove themselves, untill the Corporall releeve them, or that they be constrained by the enemie; and in such case they are to retreat to the corps-du-guard, as the corps-du-guard (being forced) are to retreat to the quarters, according to the Captains or Sergeant majors instruction.

He is to visit the souldiers entring the guard, to know whether they be sufficiently provided of powder, bullets, and match, viz. one pound of powder, two pound of bullets, and five fathom of match.

He must cause respect to be given to the corps-du-guard, and silence to be kept, whether it be about the gates or the walls, that so the noise may not hinder the hearing of the advertisements of the sentinels. He is to walk before his corps-du-guard, or to cause a Lanspassado

to do it. He muſt keep fire day and night, to light the matches, and muſt take care to ſee the corps-du-guard provided of wood, coals, and candles.

Of the Sergeant of a companie.

He ought to be able to read, write, and caſt accounts, if it may be; to keep accounts of his ſouldiers, how many be pikes, and how many muskets; the beſt armed and moſt courageous of them he is to place in the firſt rank. It is his dutie to cauſe the ſouldiers of his companie to obſerve diſcipline both poliſick and militaire, and all kindes of commands given by the ſuperiours, whereof he is to give them knowledge.

He is to inſtruct them in the managing of armes, in the keeping of rank and file, and that in ſuch order as the Sergeant major ſhall appoint.

He muſt take care of the armes and munitions, to diſtribute the powder and match to the Corporals, to place his corps-du-guards and ſentinels with his corporals, in ſuch places as his Captain or Sergeant major ſhall have appointed; often viſiting them, to ſee whether they perform their duties, imploying none thereunto but ſuch as are capable, for otherwiſe an alarm might be often given without cauſe; he muſt make frequent rounds; and if he finde a ſentinell a ſleep in the field, he is to commit him into the hands of juſtice.

When the companie marcheth, if a ſouldier ſtep out of his rank, he is to compell him to his place with the ſtaff of his halbert.

Whether he be in the field or in garriſon, he muſt take care there be no want of victuall, and if

if there be want, to demand it of the commissarie or his deputies, then he is to distribute it to his Corporals and they to the souldiers.

He must every evening fetch the word at the Sergeant majors lodging, and carrie it to his Captain, Lieutenant, Ensigne and Corporals.

He must order his companie both for their marching, embattailing, as also for their watch; but for their encamping, that belongeth to the Quartermaster.

He must place his guard at the houre appointed, and having shewed his Corporals the places for the corps-du-guards and sentinells, and there placed them, he is to give the word secretly to the Corporals, according as he shall have received it from the Sergeant major.

Of the Ensigne.

It is the Ensignes dutie to carrie his colours whersoever his Captain, or (in his absence) the Lieutenant shall command him, whether it be in assault or in battaile, having no regard to the danger, but to the means to attain it.

Entring the guard, lodging, in fight, or making *alto*, he is to bear his colours on his shoulder, advanced; but when he marcheth in champain, he may cause them to be born by one of the bravest souldiers, to which end he is alwayes to have two of them neat him.

The company marching in their order, the Ensigne is to be in the middle; but in assault, scalado, or disbanded fights, he must be at the head.

In battaile the Sergeant major appointeth him his place of march, and he ought rather to die then to quit or abandon his colours, for by los-

ſing them, he diſhonoureth both himſelf and his companie.

He muſt get the love of his ſouldiers, that ſo they may follow him with the better courage.

If the Colonell command him to plant his colours in the field, he is to do it; but he ought rather to acquaint his Captain therewith. And in caſe of alarm, without expecting any command, he muſt repair to the place of armes.

The place of armes of a Companie is before the Enſignes lodging, where all the ſouldiers muſt aſſemble in armes; and of a regiment, it is before the Colonels lodging.

Marching in battalia, he is to march courageouſly without bowing himſelf to any, unleſſe it be to his chief commanders, before whom he is to encline the head of the colours, more or leſſe, according to their degree, without making a ſhew of raiſing his hand to his hat, or bowing his knee.

Of the Lieutenant.

All the Lieutenants ought to be as able as the Captains, whom they repreſent, ſeeing that in their abſence they have the ſame charge and authoritie; and oftimes the Captains are young Gentlemen, deſcended from illuſtrious and valorous perſons, which have courage ſufficient, but want ſtrength and skill. He muſt keep the Enſigne, drum, and all the officers and appointees near him, to make uſe of them as occaſion ſhall ſerve.

He muſt neither take on, caſhier, nor puniſh any man in the preſence of his Captain, for at that time he hath no authoritie, and all that he doeth

is

is by permission and commission; but in his absence he is to be obeyed as the Captain.

His companie being ordered for combat, if his Captain be absent, he is to lead them; but if he be present, he must keep on the rear, and place his two Sergeants on the flanks, that so every man may keep his rank, and fight resolutely.

At an assault he must assist the Ensigne, and lead him to the place of combat, which he must have viewed beforehand.

It is his charge to observe the actions of the Corporals and Sergeants, to hold them to their duties, and to cause them to provide what is necessarie for the companie, and to assist them where he shall see cause.

Of the Commissarie.

The office of a Commissarie of souldiers is to cause the musters to be taken, and moneys to be payd, to receive the oath, and to give the quatters for the lodgings.

Of the Captain.

A Captain ought to be expert, diligent, and courageous; he must know the duties of all that are under him, but principally his own.

His office is to lead his companie whereſoever his Generall or Colonell shall command him.

His functions are, to give the orders to his Lieutenant and Sergeants for the marching of his companie, be it three or five in rank, placing his muskets in the front and rear, and the pikes in the middle. Or in battaillon, placing the muskets on the flanks of the pikes.

He must teach them how to fight, be it in surprise of an embuscado, in approach of cities, in assaults, encounters, skirmishes, or battailes. To lead them on prudently, labouring to bring them off with as much glorie, as he shall have courageously brought them on.

The Captain must alwayes be at the head of his companie, certain paces advanced before them, unlesse it be to joyn in battaile, for his sole person were not able to sustain the shock of the enemies pikes, but then he is to place himself in the first rank of his companie.

He must cause his souldiers to be taught the use of their swords, pikes and muskets, teaching them how to order themselves in battalia, and to rally themselves being disbanded, either by occasion of an *aito*, a narrow way, or a defeat. Also to make their huts, and all other exercises of warre.

At every dislodging he must cause his company to be put into battalia, and then to cause them to march according as the ground will permit, and at their lodging to lead them in a long order of march, either 3 or 5 in rank.

Marching with his companie alone, he cannot punish a souldier with death, unlesse he rebell, for then he ought to kill him, but for any other matter he can but disarm him, take away his accoutrements of liverie, degrade and cashier him; or commit him to the censure of the Colonell of that regiment.

He must take care for the payment of his souldiers, of their armes, victuall, and munitions, to cause the hurt to be healed, and to compose quarrels. He must make choice of an expert Lieutenant, a courageous Enligne, two diligent

Sergeants,

Sergeants, suspecting Corporals, a faithfull clerk, a carefull harbinger, a bold chirurgeon, and a pious Chaplain.

The Captain appointeth his own Sergeants, harbinger, drum, fyfe, and chirurgeon: but for his Lieutenant, Ensigne, Corporals, and Appointees, he must present them to his Colonell, and to have his leave to place them in their offices.

The companie entring the guard, the Captain is to march at the head, with a pike in his hand, and compleatly armed. If it be in the field, they are to be russet, but rich ones; if it be in a citie, having a fair plume on his head-piece, which he shall cause to be carried before him.

He must cause his souldiers to know how to fight single, how in a body.

He must know the advantages of places, armes, times and occasions, and how to make use of them.

To understand fortifications, the manner of defending and assailing of places of strength; how, and in what manner the works are to be made; that so when it shall come to his turn to direct or guard a work, he shew not himself a novice or fresh water souldier.

Of the drum.

In every companie there must be one or two drums, and over them all a drum major.

The dutie of every drum is to beat all manner of beats, as the march, the alarm, the troop, the chamadoes and answers thereunto, reveills, and proclamations.

They must know how to observe what they see, to take good notice thereof, and to make true report of it.

The

The drum major must be lodged near the Sergeant major, or in his own lodgings; it being his part to give instructions to the rest, and to observe and take into his custodie the enemies drums which enter the camp.

He may with his staff correct the drums which fail of their duties.

All the drums are to attend him morning and evening to the Sergeant major, to know the orders.

Of the harbinger.

He must have a list of the souldiers of his companie, and make the divisions for the lodgings.

At the muster he giveth a muster roll of the souldiers to the commissarie, controller, or clerk, and keeps account of the payes received and due, also of the names of the companie belonging to his Captain.

He is to take his quarter from the Quartermaster, then to mark out the Captains lodging, the Lieutenants, Ensignes, Sergeants, his own, the drums and fyfes, and to put the rest into billets or lots, and to cause the Corporalls to draw them by turn, who shall distribute them among the souldiers: this is to be done before the Ensignes lodging. He ought to keep a register of all the lodgings of his quarter.

Of the barber chirurgeon.

In every companie there must be a chirurgeon, to trim the souldiers, to attend them which are sick, to dresse the wounds of such as are hurt (being as an assistant to the chirurgeon of the regiment) having proper remedies to stench the bloud,

bloud, to hinder inflammations, and to allwage the pain.

Of the Provost.

It is the Provosts charge to purſue fugitives, to apprehend delinquents, and to impriſon them.

He hath under him a Lieutenant, a clerk, ſix Marſhals, and an executioner. His Lieutenant muſt be skilled in the lawes; if he be not, he is to procure ſome graduate in the lawes to aſſiſt him.

He ſets the priſes on all the victuall of his quarter, and no man can ſell any unleſſe it be taxed by him. He appointeth the butchers ſhambles, and is to take care that the quarters be kept clean. He maketh out proceſſes, heareth and examineth witneſſes, ſearcheth out the truth, &c. And having fitted the cauſe for triall, the Colonell, Sergeant major, and Captains judge of it, and paſſe ſentence in the name of the Generall.

Before a ſouldier be delivered to the executioner to be puniſhed for any infamous delict, he muſt be publikely diſarmed and degraded by the Sergeant major.

In marching, it is his charge to conduct the baggage, and to ſee it kept in good order.

Of the Quartermaſter of a regiment.

The office of the Quartermaſter is to quarter the regiment, and to diſtribute the quarters to the harbingers of each companie.

He muſt ordinarily be near the Colonell, and muſt every evening go to the Quartermaſter Generall to receive the orders for the diviſions and the rendez-vous of the troops, and to give knowledge thereof to his Colonell.

When

When the Marshall of the field removeth, the Quartermaster Generall, and all the Quartermasters of the regiments, with all the harbingers of companies are to accompanie him.

The distributions of lodginge being made by the Marshall of the field, his assistants, and Quartermasters Generall and delivered to the Quartermasters of regiments, they are presently to advertise their Colonels of the place, and to conduct them thereunto, either by themselves or some others.

During the time that the Quartermaster is about making the distributions of the lodgings, all the troops are to keep watch round about the place, and to send out to discover.

First he appointeth the Colonels lodging and the Sergeant majors, then his own, in the middle of the regiment if it may be, then he makes as many quarters as there be enfignes, and the harbingers of every companie choose the best lodgings for the Captains, Lieutenants, and Enfignes.

The Quartermasters of regiments must cause the harbingers to draw the billets for their quarters, every one in his order.

They must be informed of the lodgings of the whole Armie, to know to whom to give or from whom to receive supplies in case of necessitie.

If the quarter be in the open field, the Quartermaster Generall shall appoint to each Quartermaster the place and ground which he shall take, and the Quartermaster shall dispart the ground to the harbingers.

Of the Sergeant major.

His office gives him accesse to the Generall of the Armie at all houres, who speaking with him,

knows

knows from him when, where, and how his regiment shall march, whether alone or with others; whether in one battaillon or many, and in what form.

It is his office to give order how the companies shall march, so that his place gives him authoritie and command over all the Captains of his regiment.

He must be exceeding well experienced and exercised in his office, principally in embattailing his men, and to rally them being routed, and that in such form as he shall be commanded.

He must know of the Generall whether his regiment shall march in the vanguard, bataile, or rear.

He is to know the countrey, whether it be large or strait, and thereby to judge how he is to march, and what order to observe, that he may not be disturbed by the horse, artillerie, nor baggage: being ready to march away, he shall cause the drum major to beat, and he the rest.

He must advertise the Captains, cause the Ensignes to march out of their quarters, form his battaillon, and give to every Captain the place which he shall hold for that day.

Having brought his troops into the field, he must see them march away, and observe whether they march in good order. The Colonell is to lead at the head of the regiment.

Then the Sergeant major is to go to the Generall, and to keep near him as much as may be during the march, to see whether there will be any new order for him to receive.

If there be any difficult passage, the Sergeant major ought to be there present, to prevent the disorder

disorder which might happen in his regiment and to put them in order again if they were disordered. Before the regiment enter their quarters, the Sergeant major ought to go and take a view of them, or cause them to be viewed; then, at his return to the regiment, to give licence to the Ensignes to lodge, except those whose turn it is to have the guard, which must enter the corps-du-guard, and place their sentinels, untill it come to the turn of others.

Now the regiment is to be lodged either in the field or under shelter. If it lodge in the field, either the regiment is alone, or accompanied with others. If it be alone, the Sergeant major must cause it to be barricadoed, or retrenched, or enclosed by waggons or other defences of the field.

After that he is to place his corps-du-guards round about the quarters; and the sentinels at so neat a distance that they may hear each other speak, being about eighty or an hundred paces off from the corps-du-guard; they are to be double, that is, of two men, namely, a musket and a pike; and 500 paces from them, other single sentinels are to be placed, which are called perdues. In case of alarm, the sentinell-perdue shall retreat to the double sentinell; and in case of necessitie altogether (having given fire) are to retreat to the corps-du-guard.

The Sergeant major must often, and at divers houres of the night, visit the corps-du-guards.

If there be more regiments, they shall fortifie themselves with waggons, or entrench themselves, and each regiment shall take their quarter, and shall make their guard as aboveſaid.

If

If an alarm be given in the field, the Sergeant major is to betake himself to the alarm-place of the regiment, and there to form his battaillon, and send men to double the guards on that part where the alarm was given, and to give notice to his Colonell and the Generall of Foot (if he be present) of what passeth. The Enfignes must not retreat, unlesse the Generall, or their Colonell, or Sergeant major give them leave.

No Enfigne must remove from his place, nor enter into the same, without leave of the Sergeant major or his assistant. No order ought at any time to be altered but by him, for he giveth not any orders but by appointment of the Generall or Colonell.

All sorts of munitions which are to be distributed amongst the regiment, ought to be delivered to the Sergeant major, who is to divide them amongst the companies. He hath the charge to provide all things necessarie for his regiment, to send away the sick men to hospitals, commanding the Provost to provide waggons.

The Captains are to receive the advises of the Sergeant majors assistant, as from himself; the Quartermasters do usually perform this office.

The Sergeant major ought to take the word from the Generall, or the Marshall of the field, or from his Colonell; In absence of these he giveth it himself.

In the day of battaile he ought not to be on foot amongst the Captains, but must be on horseback, now on the front, then on the rear, to put in order those which might happen to be disordered.

If the regiment lodge under shelter, the Sergeant

geant major is to view the place within and without, the moats, the gates, and the walls, appointing the places for the corps-du-guards and sentinels, and the way of the rounders, that it may be free.

He must choose a place to make the alarm-place for the regiment, and there the companies are to have their rendez-vous, in case of alarm.

After that, he must lead his regiment in order into the alarm-place, placing his guards at the gates, and on the walls; that done, he shall give leave to the Captains to go to their lodgings in their severall quarters in the town, giving them order (under his hand) concerning the place whither they shall resort in case of alarm; which order he may change so often as he shall think good; for the companies ought never to be assured of the place of their station, unlesse it be for the rendez-vous within the town, but not for the quarter on the walls: for the Sergeant major must (at every turn) cause the companies to cast lots, to know what part of the walls will fall to their turns.

He ought to take care to cause the bridges, corps-du-guards and watch-houses to be repaired, if need be, and to have wood, torches, lanterns, and cresset-lights for the guards.

He is to cause the companies to enter the guards about ten or eleven a clock in the morning. He is to open and shut the town gates at the rising and setting of the sunne; and to place the watches for the walles presently upon shutting the gates, and to releeve them at the opening of them.

The

The Serg ants which have the guard must be present at the opening and shutting of the gates, and carrie the keyes of the gates to the Sergeant major, and he to the Governour; but it is better that the Sergeant major be there assisting, and be present at the placing of the guards, so often as may be.

He must have a list of all the souldiers of every companie as they passed at the muster, signed by the Commissarie or Treasurer which took the muster; and in case he finde not so many souldiers at his guard, the officers of the companies are to give him an account thereof, because it belongeth to him to give account to the Generall concerning his regiment.

Of the Sergeant major Generall.

The Sergeant major Generall receiveth from the Generall a plat of the form which he will give to his Armie, the disposition and placing of the members of it, Cavallrie, Infanterie, Artillerie; the order which they should observe in fight, with commission signed by the Generall to dispose it in that manner.

To this commission the whole Armie must yeeld obedience, and the Sergeant maior Generall with the Marshals of the field shall dispose thereof, according to the form and place which the Generall shall have prescribed.

Of the Quartermaster Generall.

He hath the same charge of the whole Army, which the Quartermaster of a regiment hath of his regiment.

Of the Colonell.

The Colonell ought to be a man of authority

and respect, to have absolute command over his Captains, from which he must procure love and reverence, which he is to gain by his valour and modestie.

The regiments being together, must march according as the King hath given them prehe-minence, and in that place which the Generall shall appoint them, in the van, battaile, or rear.

His principall charge is to lead his regiment to the combat, on the head thereof.

He ought to visit his troops, cause his guards to be well ordered, changed, and releeved, and to see that each officer do his duty, and that the works be well ordered.

He ought to see how his Companies be furnished, what armes they have, and what exercises they perform, and to command the officers what they ought to do.

In the armie the Colonell cannot give leave to a souldier to depart from his regiment, but to change his Companie; the first appertaining onely to the Generall.

The Colonell ought to be called to councell by the Generall, when matters are to be agitated which belong to his charge; where he shall heare the opinion of others, and freely speak his own. And if it be about a matter of importance, and that he knoweth his opinion to be good, though the contrarie opinions (being stronger in number) do carrie it, he ought to commit his opinion to writing, to purge himself before his Soveraigne, in case the execution of the councell prove ill. Mean time he must give way to the pluralitie of voices, and entirely obey his Generall, and appear in all

place

places where he ſhall be commanded, making it appear that the contrarie opinion which he held at the councell was not for want either of courage, or of good affection.

The Colonell muſt render all manner of obedience to the Generall of the armie, and to the Generall of Infanterie, (for they have power to command him) and to the Marſhall of the field, as having the charge from the Generall to give the orders, the quarter, the alarm-place, the field for the battaile; to cauſe the forces to march, lodge, diſlodge, enter into guard, convoy, &c.

The aſſiſtants to the Marſhall of the field, or the Sergeant major Generall, cannot command him any thing as of themſelves, but by order ſigned by the Generall, or the Marſhall of the field for the armie, with the plats and deſignes of the ground of the ſtations and places for combat, giving command by vertue thereof.

Of the Marſhall of the field.

He ought to be valorous, judicious, and expert, to remedy many caſuall accidents.

He ought to come firſt to the rendez-vous of the armie, to receive his troops there, to diſpoſe of the diſparting of the lodgings, as well for the Cavallrie and Infanterie, as for the Artillerie, victuall, and pioners.

He is to inform the Generall of the whole eſtate of the field, and then the Generall will give him the order and diſpoſition of his armie, whereof he is to give notice to all the commanders of horſe and foot, ſending them the direction.

He is to ſet down the order of the guards of the field, and of the convoyes, and to cauſe the

laws and ordinances to be published and observed.

He is to view the passages by which the Armie is to march, to know what order they must observe. To do this, he is to take three or foure troops of light horsemen, of such as are to have the guard the night following, which are warned over night to be in readinesse against the morning following, and to be at the rendez-vous which shall be appointed them, rangeing themselves under the cornet of the said Marshall of the field with the Quartermasters, Commissaries of the victuall and artillerie, engineers, harbingers, and pioners.

In marching he is to send a troop before, and one on either hand, who shall send out before them five or six scouts to discover the champain, as perdues.

If an alarm happen, he ought to be well informed of the cause, and not to mistake it; so ought he not to stay so long that he be put to flight, but shall send word to the Generall for supplies, that so the Armie may have leisure to embattaile.

If he arrive safely at the rendez-vous of the Armie, he is to send his troops half a mile or more beyond, to discover the countrey, and to get intelligence concerning the enemie; mean while he is to observe the ground and place for the camp, and having traced it out in the generall, the Quartermaster Generall shall make the divisions, and deliver them to the Quartermasters of regiments.

Finally the Marshals of the field ought to order the quartering of the whole Armie; to be

the

the first on horseback, and to alight last, being alwayes present at all the motions of the Armie.

He must take the word from the Lieutenant Generall of the Armie, to give it to all the officers of the field, which must come to him for it.

The Generall and Lieutenant Generall of horse, the Generall of foot, and the Generall of the Artillerie take the word from the Generall of the Armie, if they will not take it from the Marshall of the field.

Of the Commissarie Generall of the victuall.

The Commissarie Generall of the victuall ought to know the number of men which are to be fed, the place whither the munitions are to be brought, when they must begin to be distributed, and how long to continue, that so he may make provision of corn, and cause the bread to be baked.

The measure of wheat at Paris is this, the muyd hath twelve septiers, the septier twelve boysseaux. The septier of wheat weigheth about 240 pound, and of meslin 220 pound.

what these make of our English measures, see it in Cotgrave, and others.

The munition meslin is two third parts of wheat, and one third part of rye: the boysseaux of this meslin weigheth about eighteen pound. There is drawn out of it three pound of bran, and fifteen pound of meal, which is kneaded with ten pound of water, whereof the paste weigheth 25 pound, of 16 ounces in the pound, and makes about 20 pound of baked bread.

To every souldier is usually given two loaves a day of ten ounces weight a piece, and one pinte of wine Paris measure, such as there is 290 in a

muyd, and three muyds make a ton.

The Cavallrie is not fed with amunition-bread, becauſe they are uſually quartered under ſhelter in towns and villages. The waggons to carrie munition-bread are made after the manner of tumbrels or cheſts, each of them is drawn by foure horſes, and carrieth 1500 loaves, and a mule with wicker paniers carrieth 300.

There muſt be three times as much carriage as is needfull to carrie victuall for one day; as to feed five thouſand mouths, there muſt be ten thouſand loaves, and five and thirty mules or horſes to carrie them; being tripled they will be one hundred & five mules, which muſt be had, namely, one third part to go to fetch the bread, one third part which is coming with it, and one third part which is unlading. There uſeth ordinarily to be added to the munitions one quarter of bread and wine more then needeth.

Of the Maſter or Generall of the Artillerie.

He is abſolute over all the Artillerie and the officers thereof, and is ſubject to none but the King, and in the armie to the Lieutenant Generall.

He muſt keep account or inventorie of the pieces, powder, bullets, and equipage of the pieces, and of all the officers of the Artillerie in the whole kingdome, to inform his Majeſtie when he ſhall have a deſire to execute ſome deſigne, as to beſiege ſome place, to fight a battaile in the field, or at ſea, or to ſtrengthen his holds.

He ought to know what proviſions and pre-

parations

parations he is to make, how and where the ordinance are to be planted, at what distance they should be levelled, of what qualitie the wall is which is to be battered, and what the power is of his Artillerie.

If a souldier of the armie hath committed any offence, and can convey himself among the Artillerie, he is there as in a priviledged place, and cannot there be apprehended, unlesse it be by the Provost of the Artillerie, who shall deliver him into the hands of his Captain, after that he be informed of his delict by a legall triall.

In the situation of the ordinance he is to regard that the place be commodious, that it be easie to be defended by the souldiers, that they may skirmish with facilitie, that in case of necessitie the ordinance may speedily retreat, that they may discover, command, and batter point blank, and that their distance be not excessive.

The souldiers appointed to guard the Artillerie, ought not to come nearer it then fifty paces.

The Generall of the Artillerie ought every yeare to present a list of the officers of the Artillerie to the King, filling the vacant places with the names of such persons as he shall think most fitting; then the King either confirmeth the same, or altereth it at his pleasure, then signeth it, and causeth it also to be signed by a secretarie of state. This list is delivered to the treasurer Generall of the Artillerie, who prosecutes the assignations, and payeth the officers named in that list, taking their acquittances.

His officers are, a Lieutenant Generall, a

Guard Generall, two Controllers Generall, a Treasurer Generall (who payeth according to the Generall of the Artillerie his order) a Quartermaster, a Provolt; and each of them hath two Commissaries in all the storehouses and armories of France.

He causeth the ordinance to be founded, tryed, and mounted, he buyeth the metall, wood, bullets, iron work, pikes, muskets, and all sorts of armes, shovels, pickaxes, hatchets, hammers, ladders, &c. horses, waggons, cordage, &c. causeth the powders and fireworks to be compounded, and that in all the magazines of France.

Of the Generall of horse.

He commandeth all the light horse and carabines, and in his absence the Colonell doth it.

He lodgeth and leads them, and sends them to the conflict, and gives them the order of combat.

He is lodged with his Cavallrie at the head of the Armie, sends out every day to discover the enemie, renders an account dayly of the same and their actions to the Lieutenant Generall of the Armie.

The chiefs of the forces are the King, the Kings sonnes, the Princes of the bloud, the Generall, and the Colonells, &c.

For all the troops there is a Quartermaster, and one or two harbingers Generall.

And over every troop, a Captain, a Lieutenant, a Cornet, a Quartermaster, an harbinger, and a trumpet.

The dutie of the troops is, alwayes to scoure and discover the high-wayes and advenues by which the enemie might come, and to be ever hovering

hovering about the enemies Armie; for this cauſe they are to make great and long dayes-journeys, but are excuſed of watch in the night, except in their own quarters, and for them onely.

At the ſiege of towns they are ſent before to make waſte, to ſeize on the paſſages, to inveſt the towns, to skirmiſh, and to take priſoners, thereby to be informed of the eſtate of the town.

It is no diſgrace for the light horſe to retreat on the gallop, for their dutie is to fight as well retreating as advancing, ten againſt fifty, thirty againſt an hundred; therefore they muſt be well practiſed to make a good retreat, and to ſingle themſelves out of a greater troop then their own, and to charge them again in opportune time, according as their courage and judgement ſhall give them reſolution, and experience ſhall direct them.

Of cuiraſſiers.

The Conſtable or Generall of the armie commandeth the cuiraſſiers, and in his abſence the Lieutenant Generall of the armie.

They are divided into troops of an hundred men, at leaſt thoſe which belong to the King, the Princes, the Conſtables and Marſhals of France; the reſt are not ſo ſtrong.

The officers of every troop are a Captaine, a Lieutenant, (in the Princes troops there be Sublieutenants) a Cornet (which is ſquare for the cuiraſſiers) or a Guidon (which is long and ſplit for the harquebuſiers) a Quartermaſter, a harbinger, and a trumpet.

They may fitly march, lodge, or fight in the yan,

van, battaile, or rear, according to the order prescribed by the Constable or Generall of the armie.

The Captains choose and dispose of places amongst all their members at their pleasure, but they cannot cashier any unlesse he hath been wanting in the Kings service.

Their dutie is to keep close united, to march soft and fair, and never to turn their backs, and for this reason they must be heavie armed.

Of the Generall of Infanterie.

The charge of the Generall of the Infanterie extendeth it self over all the foot, much more absolutely then the Colonels of his regiment.

In all the regiments he maketh the Sergeant Majors, Provosts, Quartermasters, Chirurgeons, and Almoners.

All administrations of justice over all the foot, passe in his name.

He hath the nomination and presenting of the Captains to the King, he is also to give him information of the sufficiencie or insufficiencie of the Colonels, seeing that the King bestoweth their offices upon them, that so he may know all those of his kingdome which are capable, as having learned their profession amongst the foot.

Of the Constable or Generall of the Armie.

He hath the command of the whole armie.

He ought to know all the duties and charges of the officers thereof, and should be of great experience,

experience, that ſo amongſt many differing opinions, which are uſually in councels, he may be able to chooſe the beſt.

He ought to be of great authoritie in his commands, of great courage in combats, conſtant and reſolute in croſſe accidents, ſucceſſefull in his enterpriſes; and that he may be ſuch, he ought to invoke God to be propitious to him, who will give him judgement to diſpoſe his armie after the beſt manner, and (by his good diſcipline, diſpoſition, and order) to render it not onely able to overcome (which is all that a Generall can do) but will alſo make it victorious, if it depend on the power and favour of the Lord of hoſts.

Good ſucceſſes or bad ſhould not make him change countenance, but to receive both modeſtly, without diſcovering the paſſions of his ſoul by his countenance.

Impatience, ſluggiſhneſſe, choler, crueltie, or envie towards thoſe which acquire glorie under him, ſhould not be harboured in his ſoul.

He muſt be reſolute, and well weigh the occaſion of giving battaile, rather then hazard all his troops in fight; labouring to overcome his enemie as much by induſtrie as by force: as, in ſurpriſing him being diſordered, his troops being ſcattered, wearie, wet, or ſurpriſed with hunger, thirſt, cold, or ſome other accident.

He is not to ſuffer skirmiſhes, unleſſe he ſee much advantage; for by overcoming in theſe ſmall occaſions, the ſouldier becomes more courageous, aſſures himſelf of the good fortune and

good

good leading of his commanders, and easily perſwades himſelf of the victorie.

He ought to conſult with many, but never to tell his reſolution to any man, or at leaſt to very few: by this means he ſhall render himſelf ſo practiſed as he ſhall be able wiſely to lay hold on fit opportunities and the inſtant of occaſions, to prevail thereby.

He ought to acquire the love of all men, principally of the commanders, and not to weary or tire his army too much, for fear of diſeaſes, yet to cauſe his battaillons to be throughly exerciſed in all exerciſes of warre. He ought to be rigorous towards evil men, and to cauſe juſtice to be readily executed.

Of fireworks.

CHAP. XV.

IN the tenth chapter hath been ſhewed what materials were to be provided for fireworks; here ſhall be taught how they are to be compounded.

To make garlands or pitcht ropes for treſſets.

Take of black pitch twelve pound, of tallow ſix pound, linſeed oyle ſix pound, hard reſin ſix pound, turpentine ſix pound, melt theſe altogether, and lay match therein, untill it ſuck up all the compoſition and be well incorporated; then make your garlands therewith.

To

To make torches againſt rain and winde.

Take cords of fine hemp, very open twiſted, about the thickneſſe of ones little finger, beat them with a mallet till they be very ſoft; diſſolve ſaltpeter, and boil the ſaid cords therein, then let them be dried. Make a paſte of ſulphure and gunpowder beaten together, ſoaked in linſeed oyle untill it be liquid; ſteep your cords in this liquour, and let them drie again. Then take three parts of wax, two of reſin, one of ſulphure, one of black pitch, half of turpentine, a quarter of campher; melt and mix all that well together, then cover your cords after the manner of a wax candle, and joyn foure of them together, and in the middle of them a ſtaff of ſallow about the thickneſſe of a finger, prepared as the cords or matches above ſaid.

To diſſolve ſaltpeter.

Put to one pound of ſaltpeter two ounces of water, then ſet it a melting over the fire in a kettle. It will alſo diſſolve alone, but not ſo eaſily.

To bring ſaltpeter to flower.

Diſſolve the ſaltpeter over the fire, then ſtirre it with a ſtick untill it come to be like meal.

To make roch petre.

You muſt melt it alone in a kettle, then let it grow cold.

To make flowers of ſulphure.

Melt ſulphure in a limbeck, and the flowers will gather together about the helm.

To better the flowers of ſulphure, melt them and lay them into ſtrong vineger.

To

good leading of his commanders, and eaſily perſwades himſelf of the victorie.

He ought to conſult with many, but never to tell his reſolution to any man, or at leaſt to very few: by this means he ſhall render himſelf ſo practiſed as he ſhall be able wiſely to lay hold on fit opportunities and the inſtant of occaſions, to prevail thereby.

He ought to acquire the love of all men, principally of the commanders, and not to weary or tire his army too much, for fear of diſeaſes, yet to cauſe his battaillons to be throughly exerciſed in all exerciſes of warre. He ought to be rigorous towards evil men, and to cauſe juſtice to be readily executed.

Of fireworks.

CHAP. XV.

IN the tenth chapter hath been ſhewed what materials were to be provided for fireworks; here ſhall be taught how they are to be compounded.

To make garlands or pitcht ropes for creſſets.

Take of black pitch twelve pound, of tallow ſix pound, linſeed oyle ſix pound, hard reſin ſix pound, turpentine ſix pound, melt theſe altogether, and lay match therein, untill it ſuck up all the compoſition and be well incorporated; then make your garlands therewith.

To

To make torches againſt rain and winde.

Take cords of fine hemp, very open twiſted, about the thickneſſe of ones little finger, beat them with a mallet till they be very ſoft; diſſolve ſaltpeter, and boil the ſaid cords therein, then let them be dried. Make a paſte of ſulphure and gunpowder beaten together, ſoaked in linſeed oyle untill it be liquid; ſteep your cords in this liquour, and let them drie again. Then take three parts of wax, two of reſin, one of ſulphure, one of black pitch, half of turpentine, a quarter of campher; melt and mix all that well together, then cover your cords after the manner of a wax candle, and joyn foure of them together, and in the middle of them a ſtaff of ſallow about the thickneſſe of a finger, prepared as the cords or matches above ſaid.

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You muſt melt it alone in a kettle, then let it grow cold.

To make flowers of ſulphure.

Melt ſulphure in a limbeck, and the flowers will gather together about the helm.

To better the flowers of ſulphure, melt them and lay them into ſtrong vineger.

To

To make an excellent ſulphure, take one part of flowers of ſulphure, melt it: put into it half a part of quickſilver, and ſtirre it ſoftly over a ſmall fire, untill all be mixed, then ſlake it with ſtrong vineger.

To make excellent coal.

Take young twigs of haſle or ſallow, or the ſtock of a vine, put them in ſmall pieces into an earthen pot cloſe covered, then ſet the pot on the fire untill the twigs be burnt; their coal is very good.

To make good powder for muskets and piſtols.

Take ſeven parts of ſaltpeter, one part of ſulphure, and one part and a quarter of charcoal; or rather eight parts of ſaltpeter, one part of ſulphure, and one part and one fift part of coal: beat it altogether very throughly, and ſprinkle it over with good vineger, then grain it.

To make roch fire.

Take one part of common ſulphure, melt it in an earthen pot, being melted put into it half a part of courſe grained powder well dried, ſaltpeter one third part, beaten charcoal half a part; put theſe things together by little and little, being well mingled, poure them on the flore, and you have the roch fire.

To make burning bruſh-faggots to caſt into the moat, to ſhew light in the night.

Take roch fire and melt it, then anoint the faggots with it, or joyners chips, or elſe anoint them with turpentine.

To

To make fireballs to set places on fire.

Take roch fire one part, saltpeter one part, campher one eighth part, fine powder one eighth part, beat each of them severally, then mix them together with your hand, and put them into an hollow ball, having holes in divers places, with hards amongst it.

Otherwise.

Take one part of campher, one part of saltpeter, half a part of sulphure, one third part of coal, all beaten to very fine powder, then mixed with petroll untill the matter be set in clods, then set it a drying; the older it be the better it is: then you must load the hollow balls, having holes of suffioient bigness, and give fire to them by a match or week.

To make the match or week

Take half a quarter of powder, a quarter of saltpeter, two ounces of *aqua vitæ*, half a septier of vineger, and one pinte of urin, let all this be melted together; being dissolved, put into it course-spun-cotten, untill it have sucked it all up being warm, and you shall have a violent week. Take it out while it is moist, and by pieces of two, three, or foure foot long, rowl it with your hand on a table strewed with well beaten powder, and being so powdred, hang them in the shadow to drie, then lock them up in some drie place.

To make a fire trunk.

Take a piece of light wood of three foot and an half, or foure foot long, bore it through from the one end to the other with a hole of an inch in diameter, make the wood very smooth within and without, which must be an inch thick, and of a like bigneſſe every where; place at the one end an half pike, which may enter half a foot in at the hole, and nail it ſure; whip the trunk with ſtrong packthred, then anoint and knurle it with reſin and wax melted together, to keep it from water. The mixture of the powders are twelve parts of ſaltpeter, ſix of ſulphure, ſix of cannon powder, ſix of fine powder, two of glaſſe meanly beaten, two of quickſilver, and of ſal armoniack; beat all theſe ſeverally, then mix them together, and make a paſte of them with oyle of peter, more hard then ſoft, then take hards and make little balls with the mixture above ſaid, of the bigneſſe of the caliver of the trunk, and let them drie, and binde them with ſmall wyer. To charge the trunk, put a charge of beaten powder in the bottome of the trunk without ramming of it, put a ball upon that, and then a little of your mixture, continue thus untill it be filled, augmenting the charges of powder, ſo that the laſt be of two charges. You are to give fire to this trunk by the mouth of it with a match or week.

Divers

To make rockets.

All the parts following muſt be underſtood in weight and in meaſure.

The matter of rockets.

Take a part of beaten ſulphure, one part and a half of aſhes of ivie or vinetree, twelve parts of common gun-powder, well beaten and ſifted; put theſe three ſorts of powders together into a baſon or other veſſell, and mingle them with both hands till they be well mixed together; and in doing ſo, you ſhall beſprinkle them with a bruſh with common water, to keep the duſt from flying away, and that the powders may concorporate together, when you ſhall preſſe them within the concave of the rocket, you muſt take heed of powring on too much water, leſt it come to a paſte.

The concave cilinder of the rocket muſt be made of ſtrong royall paper, which muſt be rolled and mouled on a moul.

I will not here ſpeak of the manipulation, leaving that to the makers of them, as being common and vulgar, onely I will ſay that you cannot beat the matter for rockets too much with an iron hammer into the cilinders, and that the longeſt oſier ſwitch is the beſt, ſo as it weigh not more then the rocket.

Theſe ſorts of rockets, the older they be, the better: and if they be well whipped about, they will never burſt. The courſeſt powder is beſt, becauſe it is the eaſier beaten, or elſe take the duſt of powder, that is, that which hath not yet been grained.

To

To make covert-rockets, which draw fire after them untill they burst.

Take a part of beaten ſulphure, a part of aſhes of ivie or vine, half a part of oſier coals beaten, and twelve parts of gun-powder beaten and ſifted, and mix it as hath been ſaid before.

To make the compoſition of ſerpents which are added to rockets.

Take aſhes of vine one part, and of gun-powder beaten and ſifted twelve parts, and load the concaves of the quills therewith; and if you would have the ſerpents to crack, you muſt make them of paper as the rockets, and they muſt have a pottard of grained powder at one end.

To make the compoſition to charge ſtarres.

Take one part of beaten ſulphure, one part of powder, two parts of ſaltpetre, and half a part of coal of oſier; all being well beaten.

Of this compoſition take the bigneſſe of a muſket bullet, roule it with hands, and tie it about with thred.

You muſt pierce through theſe ſtarres with an iron bodkin of ſufficient bigneſſe to thred them, as a ſtring of beads or a ſtring of match to give fire to them.

CHAP. XVI.

THeir foot were divided into two kinds, pikes, and such as used flying weapons.

The pikes bore a target, or a corslet and greves, a pike from 20 to 24 foot longs and a sword.

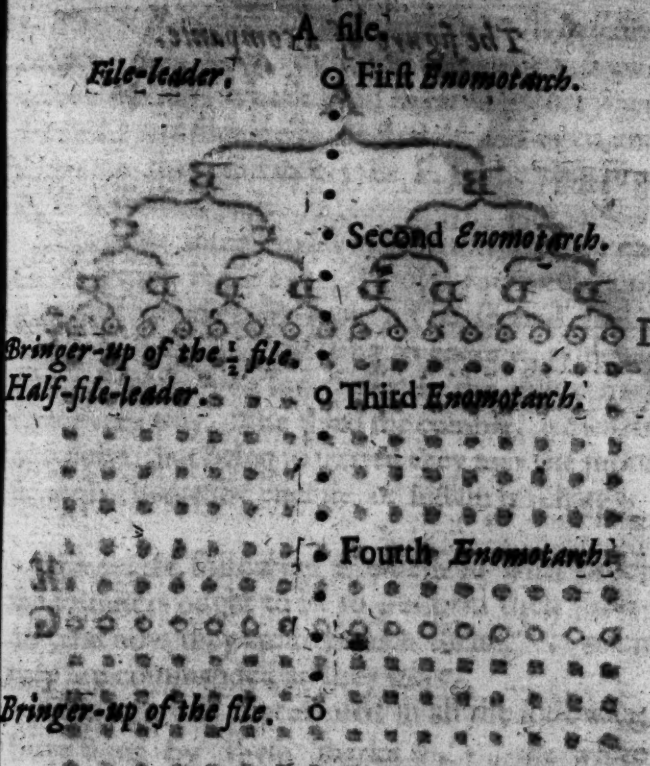
The strongest of them covered themselves with a Macedonian target of brasse, being foure foot in diameter.

All the pikes were called heavie armed.

They which used flying weapons (which were called the light armed) carried wicker targets, bows, darts, and slings.

The heavie armed souldiers were thus disposed of, 16 men made a file: the first man being the file-leader, commanded the whole file; the eighth man was the bringer-up of the front-half-file; the ninth man was the half-file-leader, and the sixteenth man was the bringer-up of the file.

The whole file was divided into foure equall parts, the first souldier of every fourth part was called *Enomotarcha*, and had command over the other three.

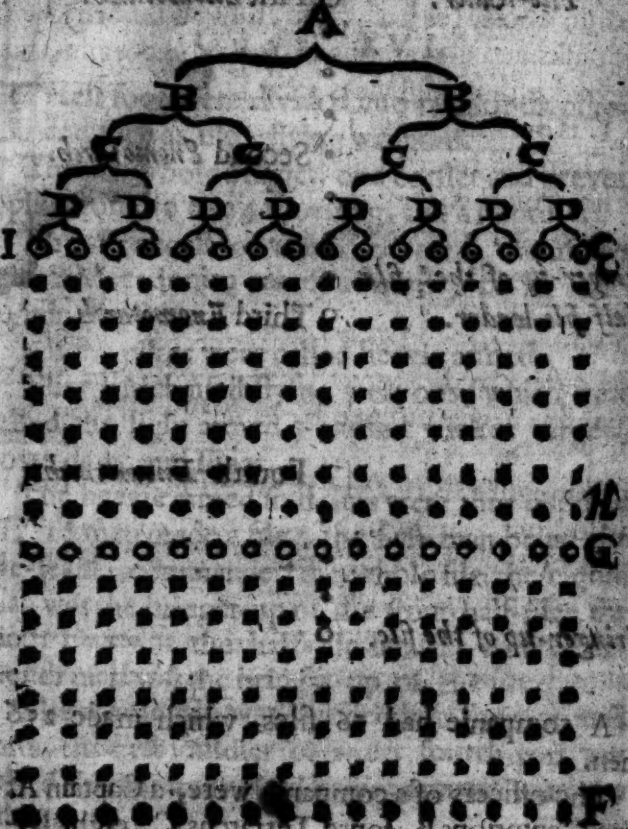


A companie had 16 files, which made 256 men.

The officers of a companie were, a Captain A. two Centurions B. foure Tetrarchs C. eight Dilochites D. 16 file-leaders I, E. 16 bringers-up of the front-half-files H. 16 half-file-leaders G. and 16 bringers-up of the files F.

Besides these they had an Enfigne, a Sergeant, a Trumpet, a Rear-commander, and a Cryer.

The figure of a companie.



The dutie of the officers was to instruct their souldiers in all the militarie motions; these motions were, to stand right in ranks and files, to face to the right, left, and rear; to double files and ranks; to perform their countermarches and wheelings.

To

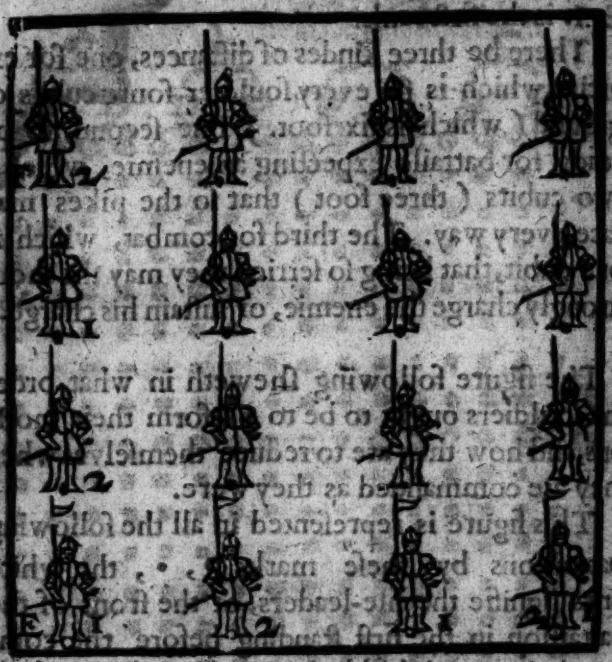
To render this more intelligible, I will describe each of them apart. First, the companie is drawn up into a body (as hath been shewed before) then the ranks and files are made straight and even, and they take their distances; E. F. is the first file, E. I. is the first rank.

There be three kindes of distances, one for exercise, which is for every souldier foure cubits of ground (which is six foot.) The second, to be ready for battaile expecting an enemie, which is two cubits (three foot) that so the pikes may face every way. The third for combat, which is one cubit, that being so serried they may the more strongly charge the enemie, or sustain his charge.

The figure following sheweth in what order the souldiers ought to be to perform their motions, and how they are to reduce themselves when they are commanded as they were.

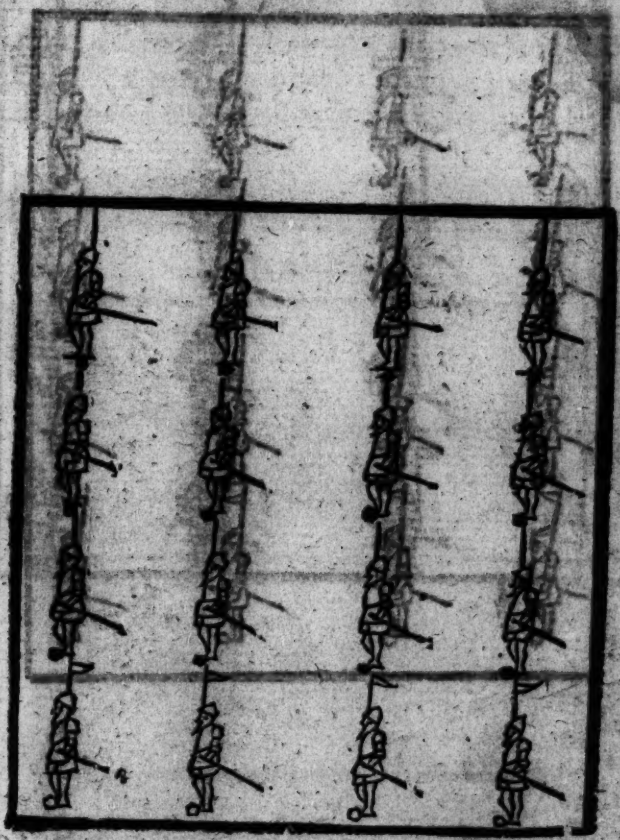
This figure is represented in all the following battaillons by these marks ○, •, the white ones signifie the file-leaders, or the front of the battaillon in the first standing before the command given, and the black ones the ordinarie souldiers. The small pricks shew the way by which every souldier moved, the figures of men shew in what form the battaillon standeth after the motion according to the command given them, and the cypher figures placed in the ranks and files shew which are to stand and which to move, or which are leaders, and which are followers.

The standing of soldiers, which have made even their ranks and files, attending the word of command to perform the exercise.



To cause all the battallion to face to the right, every souldier must turn his face to the place where his right hand was.

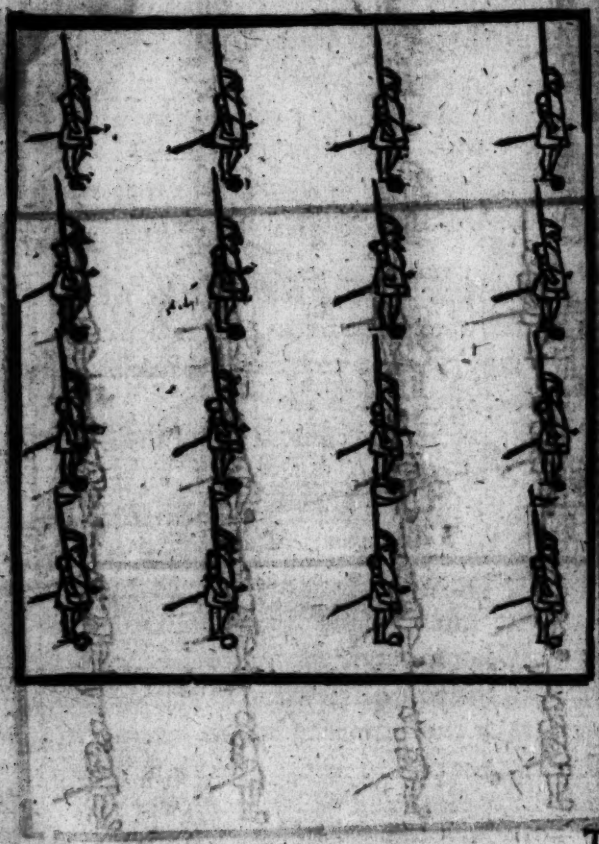
A battallion faced to the right hand.



To

To cause all the battallion face to the left, every souldier must turn his face to that place where his left hand was.

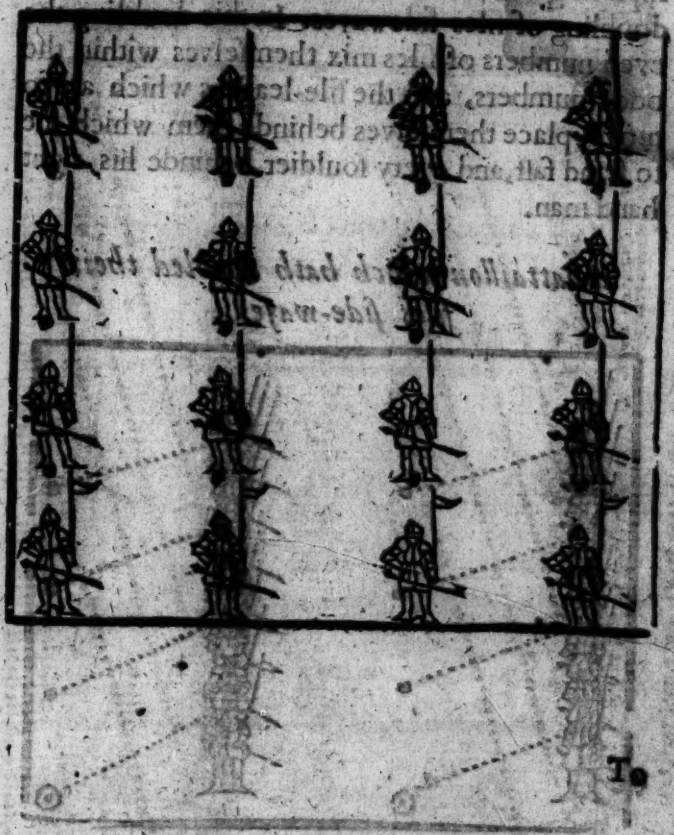
A battallion faced to the left hand.



To

To cause the battaillon to face to the rear, every souldier must turn his face by his right hand, untill it be where his back was.

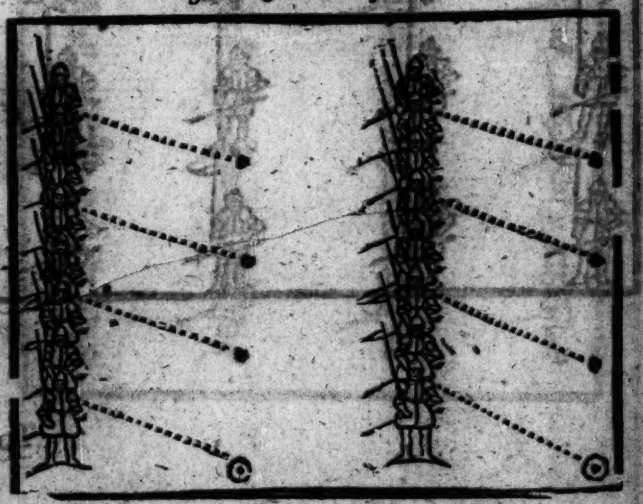
A battaillon faced to the rear.



To double files or ranks, is to put two into one. Doubling of files is called doubling the flanks, or doubling the depth; doubling of ranks is called doubling the front.

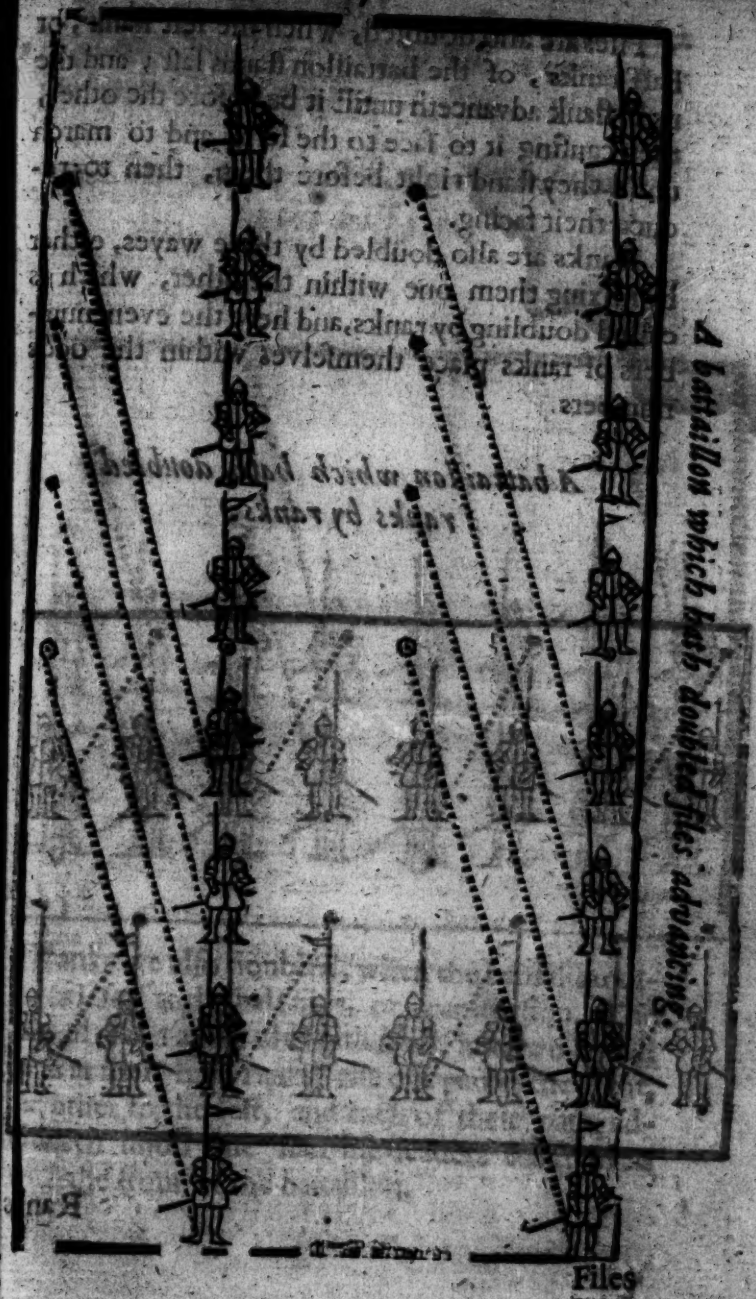
Files are doubled after three wayes, either in inplacing the one within the other, which is called doubling of files sideways. In this doubling the even numbers of files mix themselves within the odde numbers, and the file-leaders which are to move, place themselves behinde them which are to stand fast, and every souldier behinde his right hand man.

A battaillon which hath doubled their files side-wayes.



Files are also doubled when one is placed before the other, which is called doubling of files advancing, when the odde numbers place themselves before the even numbers, as the following figure sheweth.

A

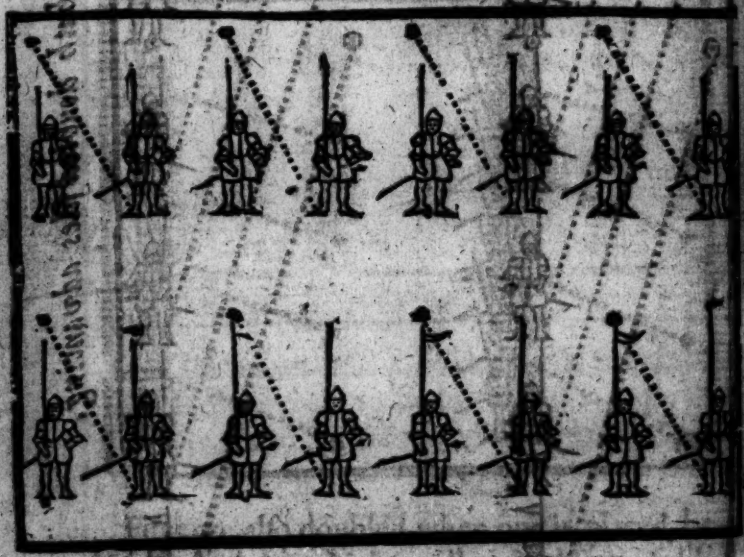


A battallion which hath doubled files advancing.

Files are also doubled, when the left flank, or half ranks, of the battaillon stands fast; and the right flank advanceth untill it be before the other, then causing it to face to the left, and to march untill they stand right before them, then to reduce their facing.

Ranks are also doubled by three wayes, either by mixing them one within the other, which is called doubling by ranks, and here the even numbers of ranks place themselves within the odd numbers.

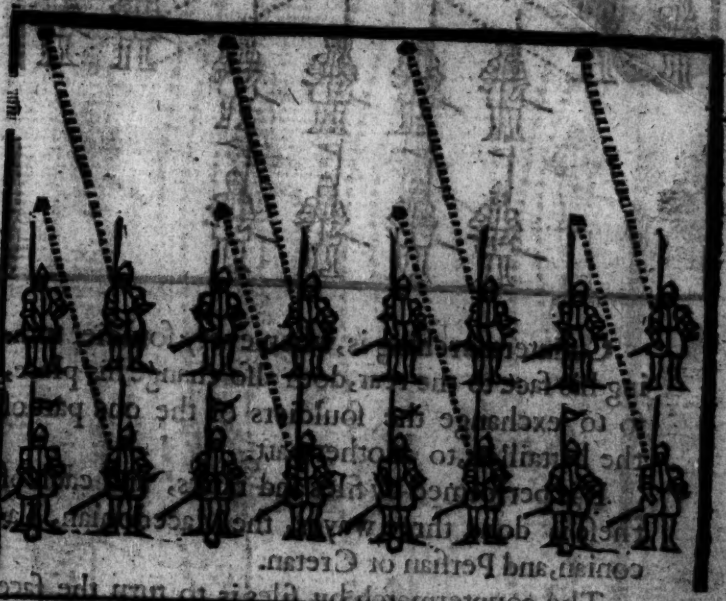
A battaillon which hath doubled ranks by ranks.



Ranks

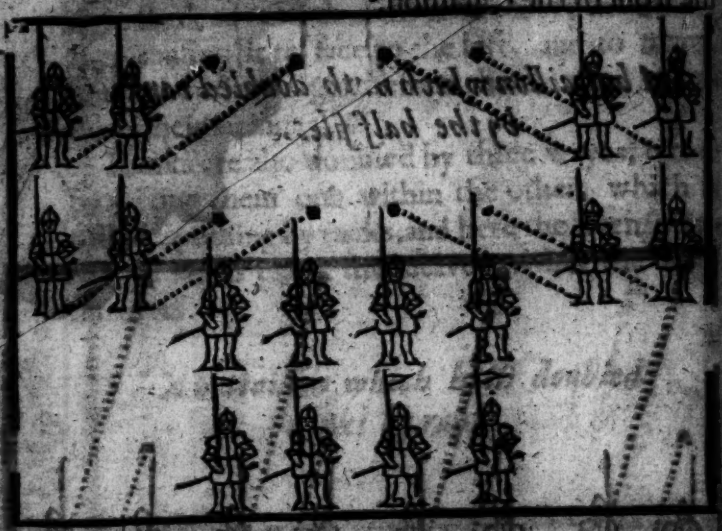
Ranks are also doubled, by causing the half files to advance, untill the half-file-leaders come up to the front of the battaillon.

A battaillon which hath doubled ranks by the half files.



Ranks are also doubled, when the battaillon divides it self at the half files, or rear division. The rear division again divideth it self into two equall parts at their half ranks, the one part to the right, the other to the left, and each of these parts advanceth untill the half-file-leaders stand even with the front of the battaillon.

A battaillon which hath doubled ranks on the flanks.



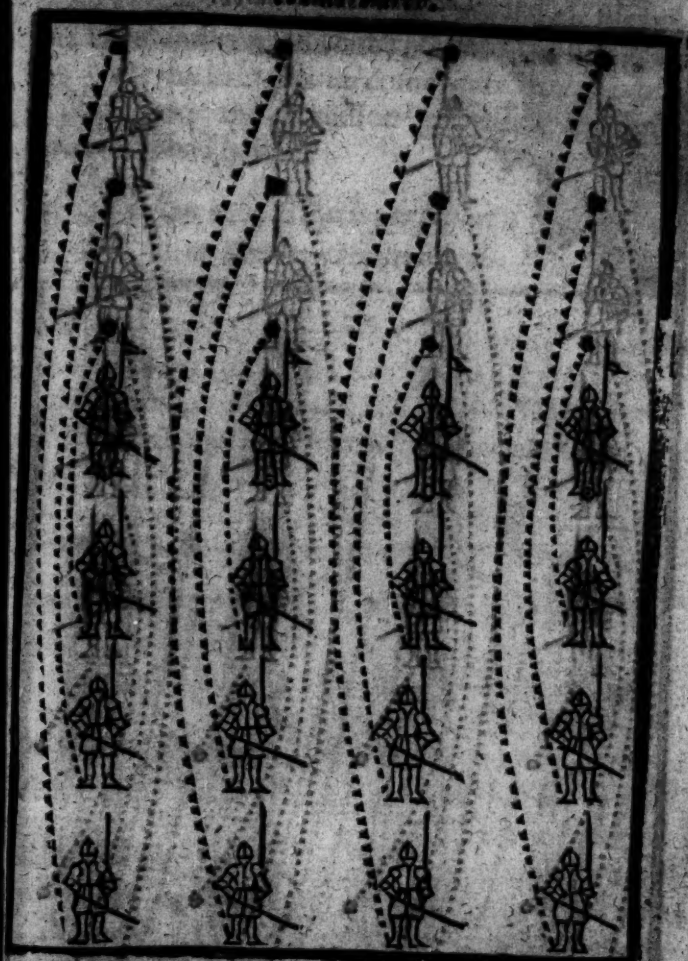
Countermarching is, when every souldier turning his face to the rear, doth also change his place, so to exchange the souldiers of the one part of the battaillon, to another part.

It is performed by files and ranks, and each of these is done three wayes, the Macedonian, Laconian, and Persian or Cretan.

The countermarch by files is to turn the face to the rear, and so to bring the file-leaders again to be foremost.

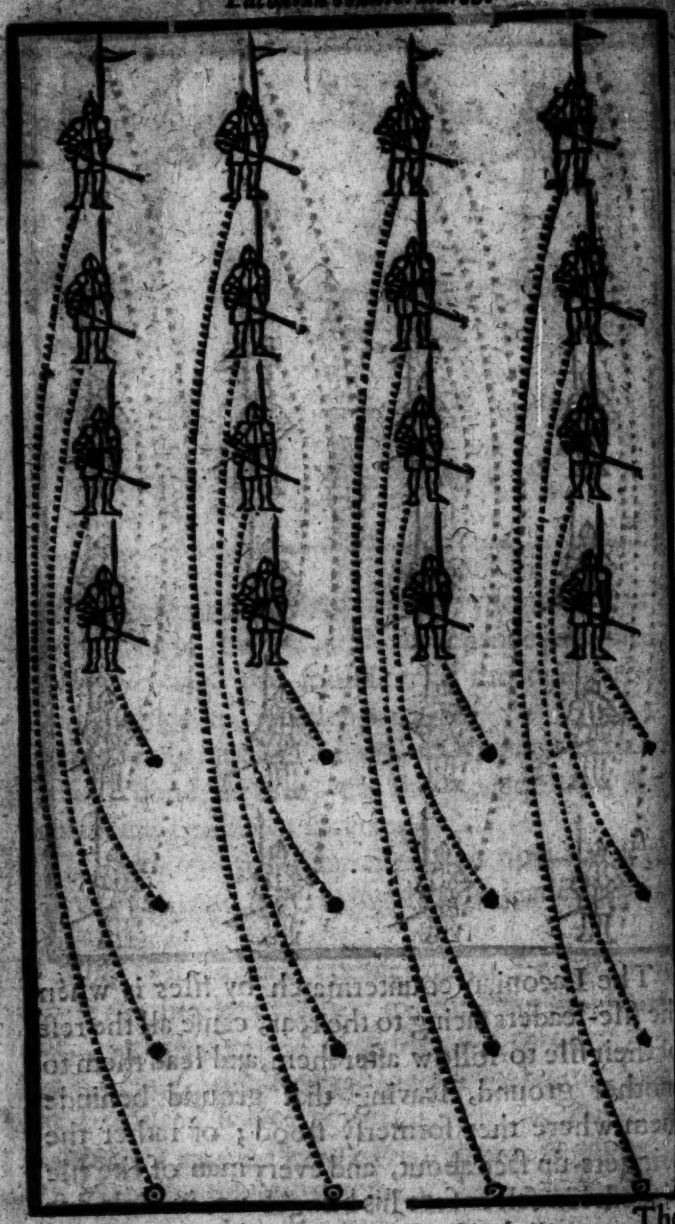
The Macedonian countermarch by files is, when the file-leaders face to the rear and stand fast, then all the rest of each file passe through and stand behinde their own leaders, by which means the battaillon leaves before it, for the field of combat, the ground where it self stood, as appeareth by the figure following.

A Lacedæmonian band performing the Macedonian countermarch.



The Laconian countermarch by files is when the file-leaders facing to the rear, cause all the reſt of their file to follow after them, and lead them to another ground, leaving that ground behinde them where they formerly ſtood; or rather the bringers-up face about, and every man of the file placeth himſelf before his bringer-up, in their due places, untill the file-leader come up to the front.

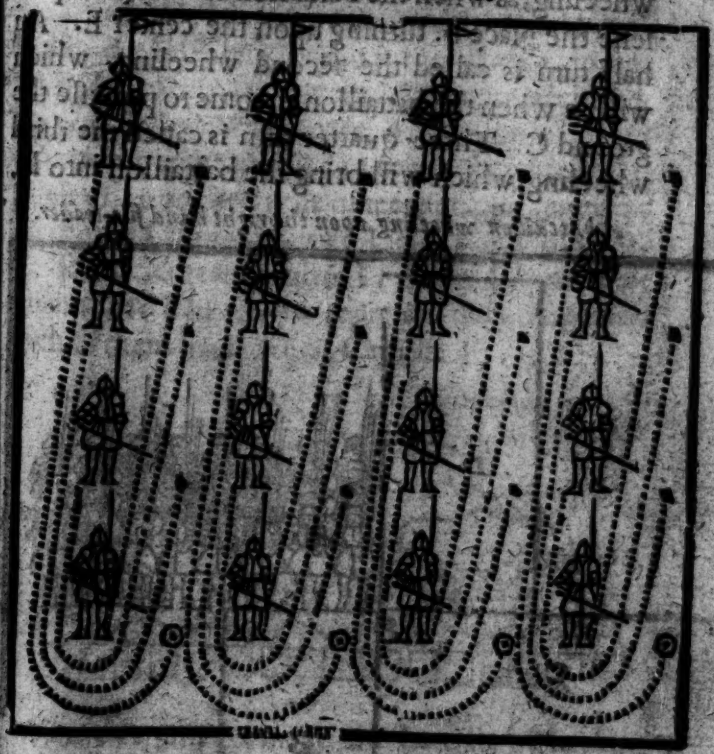
A battaillon which hath performed the Lacedæmonian countermarch.



The

The Persian or Cretan countermarch, is when the file-leaders face about, and draw their files after them, and come into the place of the bringers-up; and the bringers-up come into the file-leaders places; the battaillon possessing the same ground it had before.

A battaillon which hath performed the Persian or Cretan countermarch.



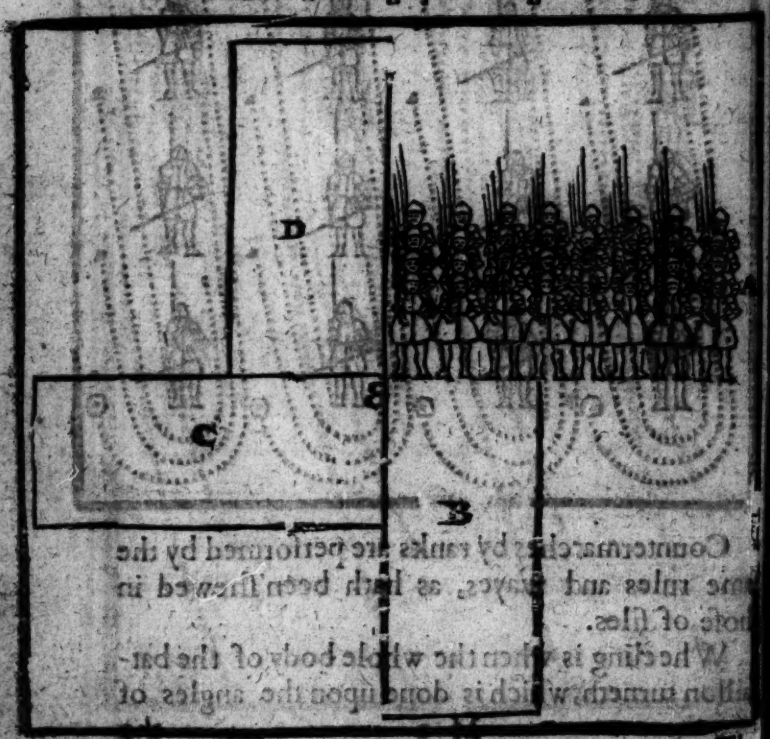
Countermarches by ranks are performed by the same rules and wayes, as hath been shewed in those of files.

Wheeling is when the whole body of the battaillon turneth, which is done upon the angles of

the battaillon (upon the right or left hand file-leader) or on the middle of the front (the middle file-leaders being as the center) or on the center of the battaillon.

When the battaillon wheeleth upon the right hand file-leader, it wheeleth to the right hand. When it is upon the left hand file-leader, it wheeleth to the left. A quarter turn is called the first wheeling, as when the battaillon A. comes to poſſeſſe the place B. turning upon the center E. An half turn is called the ſecond wheeling, which will be when the battaillon is come to poſſeſſe the ground C. Three quarter turn is called the third wheeling, which will bring the battaillon into D.

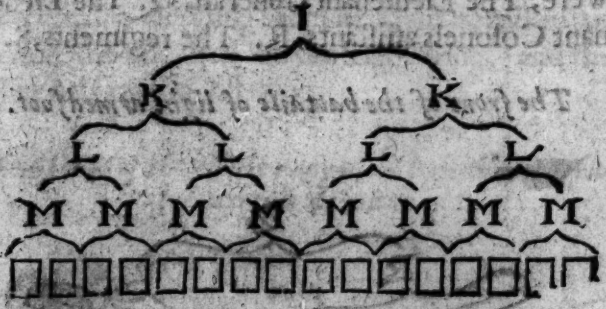
A battaillon wheeling upon the right hand file-leader.



The

The words of command are, Make ready your armes, Put your ſelves in battalia, Make even your files and ranks, Take your diſtances, Advance your pikes. Faces to the right, As you were; Faces to the left, As you were; Faces to the rear, As you were; Files to the right double, As you were; Double your files advancing, As you were; Double your files by the half ranks, As you were; Ranks double by ranks, As you were; Ranks double by the half files, As you were; Ranks double on both flanks, As you were, Countermarch, &c. As you were. Wheel, &c. As you were.

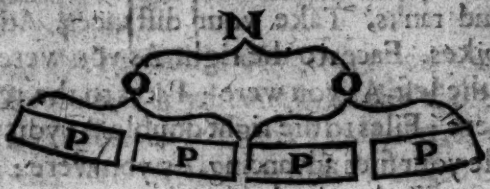
Sixteen companies made a regiment, which conſiſted of 4096 men; the officers of this regiment were, one Colonell, I. two Lieutenant Colonels, K. foure Sergeant majors, L. Eight Colonels aſſiſtants, M. The ſquares repreſent the companies, each of them having their Captain, N.



Foure regiments made the battaile of heavie armed foot; the two on the right hand were called the right wing, and the two on the left, the left wing.

The officers of theſe foure regiments were, the Generall of foot, N. The Lieutenants Generall, O. The regiments are, P.

The front of the battaile of heavie armed foot.



So much concerning the heavie armed foot, which differed not from the light armed concerning their order, but onely in their number, for the light armed had their files but of 8 deep, in all the reſt they were alike. For they had as many files, as many companies, as many regiments, as many officers, diſpoſed in the ſame order.

Foure regiments made the front of their battaile, and two made a wing: their commanders were, The Lieutenant Generall, Q. The Lieutenant Colonels aſſiſtants, R. The regiments, S.

The front of the battaile of light armed foot.

Sometimes the light armed foot marched before the heavie armed, ſometimes they marched on their flanks, ſometimes between them, and ſometimes in their rear.

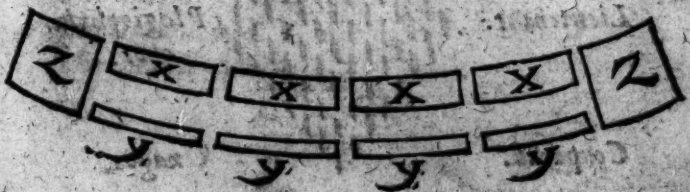
The

The form of battelle of the foot, when the heavie armed marched before the light armed.

T. is the left wing. V. is the right wing. X. the heavie armed regiments. Y. the light armed regiments.

The horſe were ſometimes placed round about the armie by ſquadrons, ſometimes on the wings, and alſo on the rear, ſometimes amongſt the armie on the wings of the battaillons, and ſometimes onely on the wings of the armie, which they did moſt uſually, dividing them into two equall parts, placing the one half on the right wing, and the other half on the left wing.

The form of the armie ranged in battaile, as well Infanterie as Cavallrie.



X. are the heavie armed foot. Y. the light armed foot. Z. the horſe, the one half on the right wing, and the other half on the left.

As they which uſe flying weapons were but half the number of the pikes, ſo the horſe were but half the number of thoſe which uſed flying weapons, that is, a fourth part of the foot.

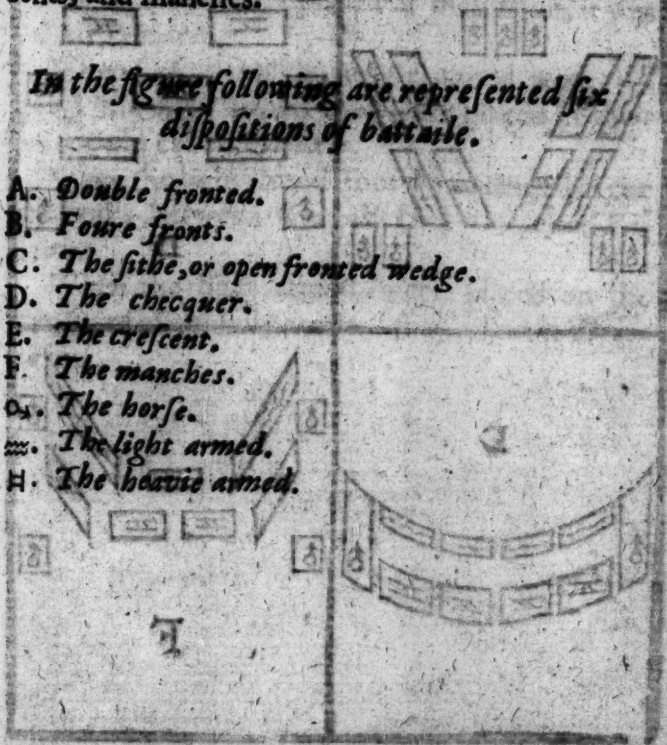
The Perſians and Sicilians diſpoſed their troops of horſe in ſquare bodies, as the French do now adayes, but the Scythians, Thracians, and Macedonians put them into a triangular form, or wedge; and the Theſſalians into a rhomb or diamond.

They ordered their horſe in theſe wedges and rhombs, ſometimes by files, and ſometimes by ranks, as in theſe figures.

The

The Grecians diſpoſed their armies into ſundrie forms, which was very eaſie for them to do, they being able to lengthen, thicken, open, cloſe it, change the figure, or turn the front as pleaſed them; by reaſon their ſouldiers were practiſed in all the motions aforeſaid; and at the ſound of the trumpet both horſe and foot knew what they were to do.

Sometime their armie marched with an even front, according to the form ſhewed before, when their enemie was before them; ſometimes in two bodies, when the enemie was on their flanks; ſometimes in foure, when they were in danger on all ſides: ſometimes in ſithes, checquers, creſcents, and manches.



In the figure following are repreſented ſix diſpoſitions of battaile.

A. *Double fronted.*
B. *Foure fronts.*
C. *The ſithe, or open fronted wedge.*
D. *The checquer.*
E. *The creſcent.*
F. *The manches.*
G. *The horſe.*
H. *The light armed.*
I. *The heavie armed.*

A
B
C
D
E
F

A battaillon which had a greater depth then front, they called *Orthion*.

That which had the front exceeding the depth, *Plagion*.

That battaillon is called oblique which fighteth by the wings, one wing serving for the vanguard.

When the battaile was begun to be ranged by the wings, and was ended at the middle, it was called *Parembole*.

When they began to range their battaile by the midst, and finished it on the wings, it was called *Prostaxis*.

When (the heavy armed foot being first placed) the light armed were placed at their front, it was called *Protaxis*.

When (after that the heavie armed were ranged) the light armed foot were placed in their rear, it was called *Epitaxis*.

When the light armed foot were ranged in the interval's between the pikes, it was called *Entaxis*.

When the light armed were placed on the wings of the whole armie, they called it *Hypotaxis*.

of

Of the heavie armed foot, called Hoplites.

Number of men.	*Files.*	*Greek names of the troops.*	*The names interpreted.*	*Greek names of officers.*	*Officers names interpreted.*
4.		Enomotia.	A quartain.	Enomotarcha.	A quartainer.
8.		Dimœria.	An half file.	Dimœrites.	An half file-leader.
16.	1.	Lochia.	A file.	Lochagos.	A file-leader.
32.	2.	Dilochia.	Two files.	Dilochites.	A Lanſpaſſado.
64.	4.	Tetrarchia.	A ſquadron.	Tetrarcha.	A Corporall.
128.	8.	Taxiarchia.	A centurie.	Taxiarcha.	A Centurion.
256.	16.	Syntagma.	A companie.	Syntagmatarcha.	A Captain.
512.	32.	Pentacoſiarchia.	A double companie.	Pentacoſiarcha.	A Colonels aſſiſtant.
1024.	64.	Chiliarchia.	A brigado.	Chiliarcha.	A Commander of a brigado, or Sergeant major.
2048.	128.	Merarchia.	A double brigado.	Merarcha.	A Lieutenant Colonell.
4096.	256.	Phalangia.	A regiment.	Phalangarchos.	A Colonell.
8192.	512.	Diphalangia.	One wing of the regiment.	Diphalangarchos.	Lieutenant Generall of foot.
16384.	1024.	Tetraphalangia.	The battaile of the heavie armed foot.	Tetraphalangarchos.	The Generall of foot.

Of the light armed foot, called Pſyllagi.

Number of men.	Files.	The Greek names of the troops.	The names interpreted.	The Greek names of the officers.	The officers names interpreted.
4.		Dimœria.	Half a file.	Dimœtites.	Half file-leader.
8.	1.	Lochia.	A file.	Lochites.	A file-leader.
16.	2.	Dilochia.	Two files.	Dilochites.	A Lanſpaſſado.
32.	4.	Syſtaſis.	A ſquadron.	Syſtaſiarchos.	A Corporall.
64.	8.	Pentecontarchia.	A centurie.	Pentecontarchos.	A Centurion.
128.	16.	Hecatontarchia.	A companie.	Hecatontarchos.	A Captain.
256.	32.	Pſyllagia.	A double companie.	Pſyllagiarchos.	A Colonels aſſiſtant.
512.	64.	Xenagia.	A brigado.	Xenagiarchos.	A Sergeant major.
1024.	128.	Syſtema.	A double brigado.	Syſtemarchos.	A Lieutenant Colonell.
2048.	256.	Epixenagia.	A regiment.	Epixenagiarchos.	A Colonell.
4096.	512.	Stiphos.	One wing of the battaile.	Stipharchos.	The Sergeant major Generall of foot.
8192.	1024.	Epitagma.	The battaile of light armed foot.	Epitagmarchos.	The Lieutenant Generall of foot.

Of the horse.

Number of men.	*The Greek names of the troops.*	*The names interpreted.*	*The Greek names of officers.*	*Officers names interpreted.*
36	Embolos.	Half a troop.	Embolarchos.	A Lieutenant.
64	Archia.	A troop.	Archos.	A Captain.
128	Epilarchia.	A double troop.	Epilarchos.	Sergeant major.
256	Tarentinarchia.	Foure troops.	Tarentinarchos.	Lieutenant Colonell.
512	Hipparchia.	A regiment.	Hipparchos.	Colonell.
1024	Ephipparchia.	A double regiment.	Ephipparchos.	Sergeant major Generall.
2048	Telarchia.	One wing of the horse.	Telarchos.	Lieutenant Generall.
4096	Epitagma.	The grosse of Cavallrie.	Epitagmarchos.	Generall of horse.

Of the Romane Militia, in the time of Polybius.

Chap. XVII.

THe Romanes managed their martiall affairs after this manner : They choſe out of all the people ſuch as were moſt fit to bear armes, as well for the Infanterie as for the Cavallrie.

Concerning the Infanterie, the pooreſt and youngeſt of them were appointed to be *Velites*; the next above theſe, to be *Haſtati*; they which were in the flower of their age, to be *Principes*; and the ancienteſt to be *Triarii*.

The armes of theſe foure ſorts of ſouldiers were theſe: The *Velites* bore a ſword, a javelin or dart three foot long, and an inch thick, with an iron at the end one foot long, a target of three foot in diameter, and an head-piece of leather; ſome bore ſlings, and ſome bows.

The *Haſtati* and *Principes* bore each of them a target (two foot and an half broad, and foure foot long, or foure foot and an handfull) a ſharp-pointed ſword, and cutting on both ſides, and very ſtiff, an head-piece of braſſe with creſts and plumes, two piles of wood, the one ſlender as a dart, three cubits long, with an iron at the end; and one thick one, an handfull in thickneſſe, three cubits alſo in length, at the end whereof there was an iron of the length of the pile, half whereof was driven into the wood, which was faſtened ſtrongly thereunto, the other half extended, with a ſharp point, being furniſhed with hooks.

This

This iron, next to the wood, was one finger and an half thick, the finger being accounted at foure barly kernels, and the handfull at foure fingers breadth.

The *Triarii* bore the same armes which the *Principes* did, saving the piles, for in steed of them they bore pikes.

The *Hastati* used to bear them in former time, and had their name from thence, but they quitted them to take piles.

The *Hastati*, *Principes*, and *Triarii* bore a breast-plate of brasse or iron, a foot square; and the richer sort armed themselves with scales or mails, fastned together with hooks.

In a legion there were 4200 men of the foure sorts of souldiers aforesaid, *Velites*, *Hastati*, *Principes*, and *Triarii*; divided after this manner: There were 600 *Triarii*, 1200 *Principes*, 1200 *Hastati*, and as many *Velites*.

As well the *Hastati*, *Principes*, as *Triarii*, were divided each into ten parts, called Maniples; so that in a legion there were 30 Maniples, without reckoning the *Velites*; for they were equally distributed amongst each Maniple. The *Hastati* being 1200, divided into ten Maniples, each contained 120 men; so much were those of the *Principes*, and 60 those of the *Triarii*; and dividing the 1200 *Velites* by 30, to serve for such as used flying weapons to the Maniples aforesaid, it will appear that every Maniple of *Velites* contained 40 men.

One Maniple of *Hastati*, one Maniple of *Principes*, and one of the *Triarii* with the *Velites*, made a Cohort: for there were ten Cohorts in a Legion, and six Maniples in a Cohort; namely,

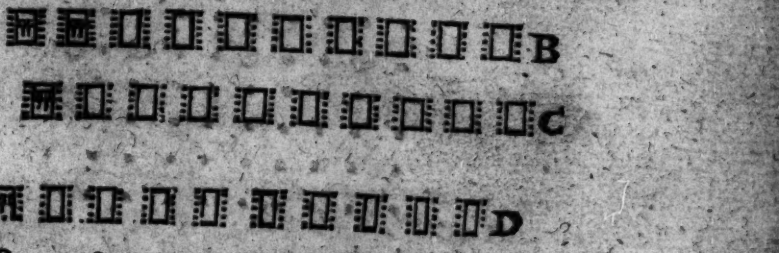
one

one of the *Haſtati*, one of the *Principes*, one of the *Triarii*, and three of the *Velites*.

The *Velites* fought disbanded, keeping neither rank nor order, and it was their dutie to begin the skirmish and battaile; but the *Haſtati*, *Principes*, and *Triarii*, were ranged into Maniples. All the Maniples of the *Haſtati* stood in one front, ſo did thoſe of the *Principes*, in the rear of them, and thoſe of the *Triarii* in like manner in the rear of the *Principes*.

The diſtance of the Maniples was ſuch, that one Maniple might ſtand betwixt two of them, becauſe that if the *Haſtati* were repulſed, they might retreat into the intervalls or ſpaces which were between the Maniples of the *Principes*, and ſo fight together. And if both *Haſtati* and *Principes* were defeated, they might retreat between the Maniples of *Triarii*, and ſo fight again all together, as well *Haſtati*, and *Principes*, as *Triarii*.

The form of a Legion embattailed.



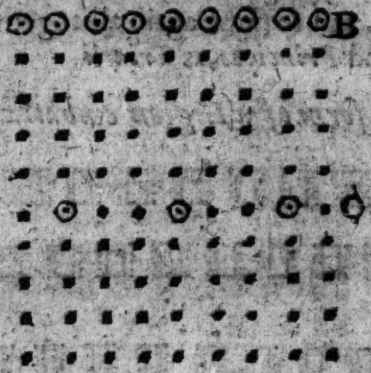
B. B. *are the Maniples of Haſtati.* C. C. *thoſe of the Principes.* D. D. *thoſe of the Triarii. The pricks which are about the Maniples, repreſent the Velites.*

Over every Maniple were two commanders, called Centurions, a firſt, and a ſecond; when both of them were preſent with their Maniple, the firſt com-

commanded the right flank, and the second the left: and if one of them were absent, he which was present commanded the whole Maniple. In every Maniple were two Enfignes, one under each Centurion, and two Sergeants. Every ten men had also a commander, called a Decurion, and over all the Legion there were six Tribunes or commanders in chief.

Every Legion had 300 horse, divided into ten troops called Turmes, every one of which had 30 souldiers, three whereof were Decurions or file-leaders, and three bringers-up. The first file-leader, called the Prefect, commanded the troop, in his absence the second, and in eithers absence the third did it. In every troop there was a Cornet.

Three Turmes in a companie.



B. *The file-leaders.*
C. *The three Cornets.*

The Romanes made use of their Allies in their warres, and had a like number of foot of their Allies as they had of citizens of Rome, and the Legions were alike in form, armes, and number of men: but concerning the Cavallrie, the Allies were

were double the number of the Romanes. It is true that of the foot they took the fifth part, and of the horſe the third part for extraordinarie, and the reſt of the foot they divided into two equall parts, which they placed on the flanks of the armie, and called thoſe on the right hand, The right wing, and thoſe on the left hand, The left wing, ſo that when the Roman Legions conſiſted of 4200 men, the wings of the Allies were 3360, and the Maniples of the *Haſtati* and *Principes*, each of them were 92; of the *Triarii* 60; and of the *Velites* 30. And the troop of extraordinarie foot in every wing was 840 men. The Cavallrie of the Allies for every of their Legions was 600 horſe (double the number of the Romanes) of theſe they took a third part (namely 200) for extraordinarie, and divided the remaining 400 into ten Turmes, each of them of 40 horſe, over which there were a Comet, a Prefect, three Decurions or file-leaders, and three bringers-up, as amongſt the Romanes. Theſe extraordinaries were imployed for guards for the Conſuls, and for troops of reſerve in combats.

When foure Legions were ranged in battaile, all the Roman Cavallrie was on the right hand, that of the Allies on the left hand, and the extraordinarie Cavallrie of the Allies was placed on the right hand of the Roman horſe, and the extraordinarie Infanterie of the Allies was ranged between the Legions and the wings, over againſt the *Triarii*.

Foure Legions ranged in Battalia by Maniples.

A. *The Cavallrie of the two wings of Allies.*

H. I. K. *The Hastati, Principes, and Triarii of the first Roman Legion.*

E. F. G. *The Hastati, Principes, and Triarii of the second Roman Legion.*

L. M. N. *The Hastati, Principes, and Triarii of the right wing of the Allies.*

B. C. D. *The Hastati, Principes, and Triarii of the left wing of the Allies.*

Q. *The two extraordinarie Cohorts of the left wing of the Allies.*

R. *The 2 extraordinary Cohorts of the right wing of the Allies.*

T. *The Imperator or Generall.*

N. *The Legate of the right wing.*

D. *The Legate of the left wing.*

O. *The Cavallrie of the two Roman Legions.*

P. *The extraordinarie Cavallrie of the Allies.*

When

When the Legion consisted of 4000 men, more or lesse, it was divided according to the aforesaid proportion; as when the Legion contained 5100 men, the *Velites*, *Hastati*, and *Principes*, were each of them 1500, and the Maniples of the *Hastati* and *Principes* 150. Concerning the *Triarii*, they never increased nor diminished their number of 600, nor their Maniples of 60, and the Maniples of the *Velites* were of 50 men a piece.

The Legions have oft-times been augmented; for in *Romulus* his time they contained 3000 foot and 300 horse.

In the time of *Camillus*, they were 4000 foot and 300 horse.

In *Cæsars* time, 5000 foot and 600 horse.

And in the time when the Sabines joyned themselves with the Romanes, it consisted of 6000 foot and 600 horse.

When the armie was thus strong, the Legions were ranged in battalia by Cohorts, and not by Maniples. As when *Cæsar* fought against *Afranius*, he placed in every Legion, foure Cohorts of *Hastati*, three of *Principes*, three of *Triarii*. The *Velites* were about the middle of the armie, and the horse on the flanks.

Five Legions ranged in battalia by Cohorts.

A. B. C. *Ten Cohorts of a Legion.*

D. E. F. *Ten Cohorts of another Legion.*

G. H. I. K. L. M. N. O. P. *are three other legions, each of them being divided into ten Cohorts.*

R. *The Cavallrie of Allies.*

Q. *The Roman Cavallrie.*

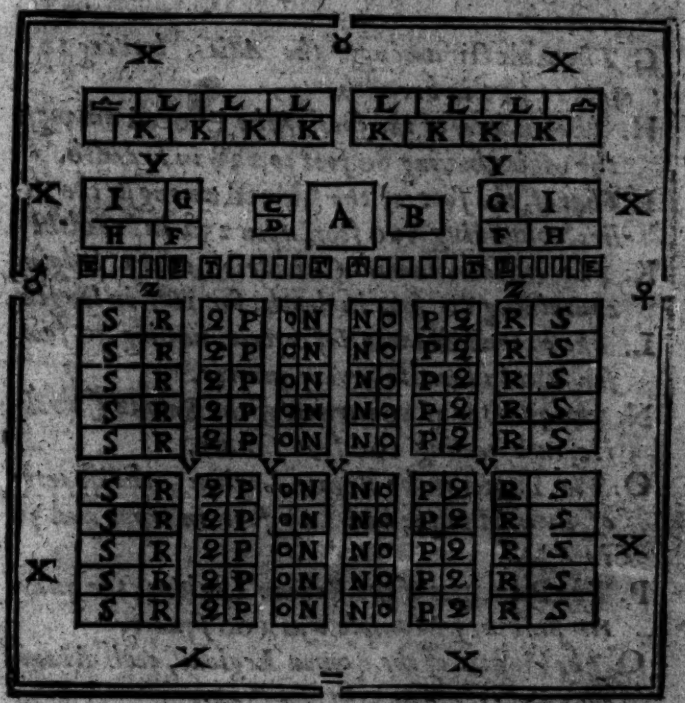
S. *The extraordinary Cavallrie of the Allies.*

T. V. *The extraordinarie Cohorts of the Allies.*

Con-

Concerning their manner of encamping, it was also such as is here shewed by a quartering of two Roman Legions. And if the armie were greater, they lengthened the camp on the right and left hand. If there were two armies together, they made two equall quarters, which they joyned on that side of the Pretorian gate.

The quartering of foure Roman Legions.



A. *The Pretorie, which contained* 200 *foot square.*
B. *The treasurie,* 200 *foot long, and* 100 *foot in depth.*

C. D. *The two Legates tents, the ground for each of which contained* 50 *foot in depth and* 100 *in length.*

E. *The Prefects over the Allies, whose lodgings were square; each side having* 150 *foot; their tents were* 12 *in all.*

T. *The Tribunes of two Roman Legions: their lodgings were square, of* 150 *foot aside, and* 12 *tents.*

F. *The lodgings of the Cavallrie of the* Evocati *amongst the Allies, having* 80 *foot to* 125 *in breadth.*

G. *The* Ablecti *amongst the Allies, having* 120 *foot to* 112 *in breadth.*

H. *The quarter of the foot of the* Evocati *amongst the Allies, having* 80 *foot to* 238 *in breadth.*

I. *That of the foot of the* Ablecti *amongst the Allies, containing* 120 *foot, upon* 252 *in breadth.*

K. *The extraordinarie Cavallrie, every lodging containing* 80 *foot in depth, for* 167 *in length.*

L. *The extraordinarie Infanterie, having* 70 *foot, for* 200 *in breadth, every quarter.*

N. *The quarter of* 20 *turmes of the Roman Cavallrie, each having* 100 *foot square.*

O. *The* Triarii *of the Roman Legions; the quarter of each Maniple had* 100 *foot in front and* 50 *in depth.*

P. *The* Principes *of the Roman Legions; the quarter for every Maniple was* 100 *square.*

Q. *The* Haſtati *of the Roman Legions, each Maniples quarter was* 100 *foot square.*

R. *The Cavallrie of the Allies; the quarter for their turmes was* 34 *foot in length and* 100 *broad.*

S. *All the Infanterie of the Legions of the Allies, every*

every Cohors having 100 feet in front and 200 in depth.

V. The streets, being 50 feet broad.

X. The alarm-place, being 200 feet broad.

Y. Z. Two streets, each of them being 100 foot broad.

♂. The Pretorian gate.

♀. The right hand gate.

☿. The left hand gate.

♃. The Decumane gate.

♎. Void places reserved to lodge strangers.

* Observe that from the Decumane gate there runneth a street, which divideth the two Legions, which have all their quarters facing outward, and their backs meeting at that street, both fronting to their alarm-places X.

The

The manner of forming all sorts of battaillons.

Chap. XVIII.

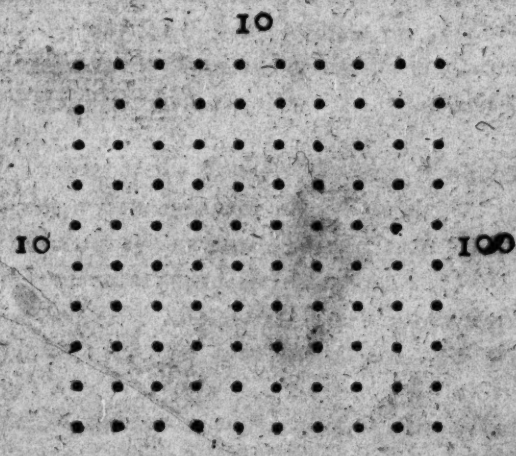
The authour followeth other writers in this chapter, which some (since) have also retained; but are (in my opinion) of little use, and savour of curious impertinencie.

FIve sorts of battaillons are ordinarily made, namely, square of men, square of ground, doubled, when the front is to the depth according to a proportion given, and the broad fronted battaillon.

The space which every souldier requireth, marching in battalia, is three foot in front and seven in depth.

To make a battaillon square of men.

Suppose the number of men be 100, take the square root of 100, which is ten, which is the number of men which must be placed in front, and also in flank; As in the figure following.

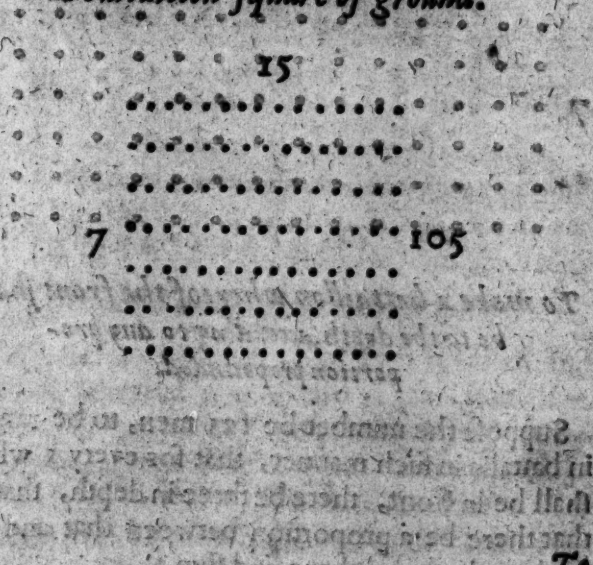


To

To make a battaillon ſquare of ground.

Suppoſe the number be 105 men, multiply it by three (which is the ſpace which every man occupieth in front) it will produce 315: divide this number by 7 (which is the ſpace which a man requireth in depth) it will produce 45. Take the neareſt ſquare root to this number, which is 7, and that is the number of men which muſt ſerve for your files. After this divide your 105 men by 7, it will produce 15, which is the number for the front: ſo that this battaillon for every 7 men in front, hath 3 in flank.

A battaillon ſquare of ground.

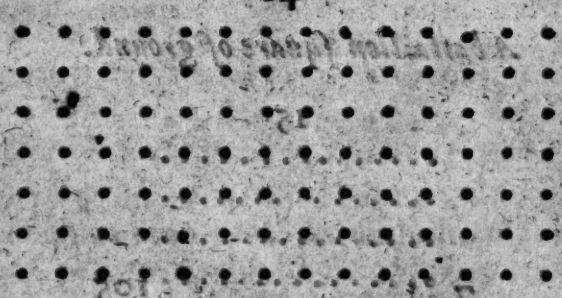


To

To make a doubled battaillon, that is, which hath twice as many men in front as in depth.

Suppose the number be 98 men, double this number, then will be 196. take the square root of this number, which is fourteen, and that is the number of men which must be in front, and the half of that, which is seven, must be placed in the depth.

A doubled battaillon.

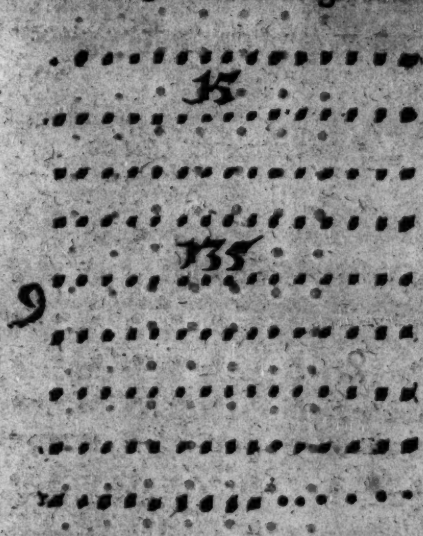


To make a battaillon whereof the front shall be to the depth, according to any proportion propounded.

Suppose the number be 135 men, to be ranged in battalia in such manner, that for every 5 which shall be in front, there be three in depth, that is, that there be a proportion between that and the flanks, as between three and five.

Divide

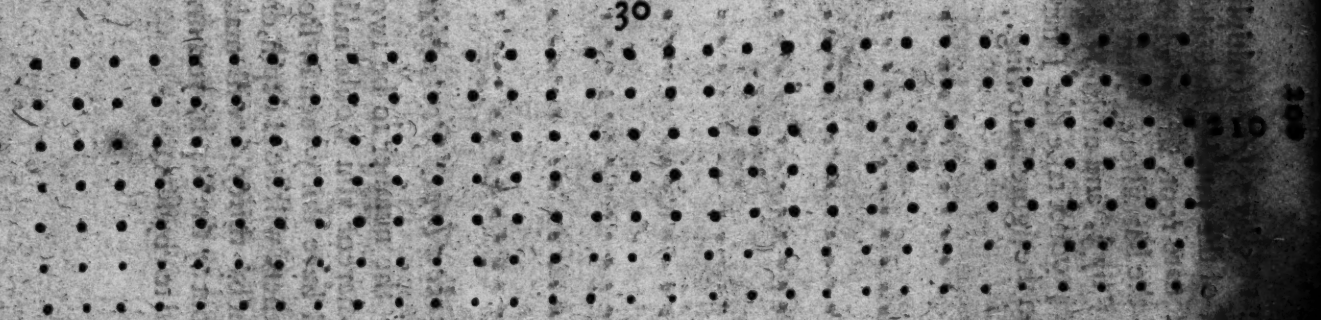
Divide 135 by 5, and multiply the product by three, and of the number which it will produce, take the ſquare root, which will be nine, for the depth of the battaillon. And to finde the front, divide 135 by 3, and multiply the product by 5, and of the product take the ſquare root, which is fifteen, as in the figure following.



To make a broad fronted battaillon.

Suppoſe the number to be two hundred and ten men, whereof you would make a battaillon which ſhall have thirty men in front; to know how many there will be in depth, divide two hundred and ten by thirty, it will make ſeven. To finde the front by the depth, you muſt divide two hundred and ten by ſeven.

A broad-fronted battaillon.



The ſquare battaillons (of men or ground) are weak of front, and thoſe of broad front are weak in depth. The Spaniards often uſe doubled battaillons, And the Hollanders broad fronted ones, for they make their files no deeper then [a] ten men.

[a] *Seeing that not onely the Hollanders, but all others, make not their files to exceed the number of ten (ſome be but eight, and the Swedes uſe but ſix) to what purpoſe ſhould the ſquare root ſerve, eſpecially in a great body?*

To finde the ſquare root, to the number of 4096.

To finde the ſquare root of a number, as if you were to make a ſquare battaillon of 1600 men, looke in the table following in the column of ſquares 1600, and you ſhall finde over againſt it in the column of roots 40, for the root or number of men which muſt be placed on all ſides of the battaillon.

A table to find the square root to the number of 4096.

Squares.	Roots.	Squares.	Roots.	Squares.	Roots.
4	2.	529	23.	1939	44.
9	3.	576	24.	2025	45.
16	4.	625	25.	2116	46.
25	5.	676	26.	2209	47.
36	6.	729	27.	2304	48.
49	7.	784	28.	2401	49.
64	8.	841	29.	2500	50.
81	9.	900	30.	2601	51.
100	10.	961	31.	2704	52.
121	11.	1024	32.	2809	53.
144	12.	1084	33.	2916	54.
169	13.	1156	34.	3025	55.
196	14.	1225	35.	3136	56.
225	15.	1296	36.	3249	57.
256	16.	1369	37.	3364	58.
289	17.	1444	38.	3481	59.
324	18.	1521	39.	3600	60.
261	19.	1600	40.	3721	61.
400	20.	1681	41.	3844	62.
441	21.	1764	42.	3969	63.
484	22.	1849	43.	4096	64.

F I N I S.

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METHOD

FOR THE

EASIE RESOLVING

OF ANY

Militarie Queſtion

propounded.

By

The Lord of PRAISSAC.

Engliſhed by *I. C.*

CAMBRIDGE:

Printed by ROGER DANIEL, Printer
to that famous UNIVERSITIE.
1639.

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To the worshipfull, my worthily honoured friend PHILIP SKIPPON Esquire, Captain of a Companie of foot, in service of the *States* of the united Provinces.

SIR,

IT pleased you to put me upon the translation of the Lord of *Praissac's discourses*, and (afterwards) of this last piece of his; which I conceive he intended, as a *Corollarium* to conclude with; or as an *Epiteme* of his other tractes, to put his readers to trie what they had profited by them, by setting these wheels awork. These are no speculations for every *Tyro* to meddle with; but rather for such as had followed your Worthie self in your foure and twentie years *Militia* (in *Denmark*, *Germanie*, the *Low Countries* and elsewhere) to exercise their thoughts in; and to recollect those things which might (perhaps) be slipped out of memorie. I cannot compare this piece to any thing better (for so much matter in so small a room) then to that admired artificiall *Flie*, made by that famous *German Joan. De monte regio*, (celebrated by divine *du*

hand round about a table, and so to his hand again. As little as this piece is, (and my pains in it the least that may be) yet I am confident (having so much experience of your true candor and sweet disposition) you will dain to accept of it, from

your humble servant

I. C.

A

A SHORT METHOD,

for the eaſie reſolving of any *Militarie queſtion* propounded.

EVery *militarie queſtion* may be reſolved by, *Whether or no, with whom, where, when, how, and how much. Deliberating* to make *warre, peace, truce, parly, alliance, league*; Conſidering the diverſitie of *perſons*, as *compatriots, allies, confederates, mercenaries, neuters*, and *enemies*: directing your ſelf in the *action* propounded, either to *advance, abide, retreat fight, lodge, refreſh*; according to the *occaſion* which *men, meanes, munitions, time, works*, and the *countrey* do afford; doing all things according to *reaſon*, which proceedeth from *honour, profite, obedience, obligation, neceſſitie* and *facilitie*; uſing the help of *inſtruments* fitting for execution, as *waggons, ladders, bridges, pickaxes, ſhovels*, and *boats*: meeting with *accidents* which might befall by *noiſe, ſun, water, cold, duſt*, and *ſmoak*, by the *faſhion* of *order, commoditie, aſſurance, ſurpriſe, diligence*, and *foreſight*. So that you may make an *encycle* of nine moveable circles (as the figure ſheweth) namely of *queſtions, deliberations, perſons, actions, occaſions, reaſons, inſtruments, accidents*, and *faſhions*. Every circle containeth ſix common places, the greateſt is called the firſt, and the leaſt the ninth. If you turn the ſecond circle with a whole revolution, upon each common place of the firſt, you

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shall finde 36 questions, as, [illegible] you ought to make warre, whether you ought to make peace, whether you ought to make truce, whether you ought to parly, whether you ought to make alliance, whether you ought to make league. With whom you should make warre, with whom you should make peace, with whom you should make truce, with whom you should parly, with whom you should make alliance, with whom you should make league. Where you should make warre, where you should make peace, where you should make truce, where you should parly, where you should make alliance, where you should make league. When you should make warre, when you should make peace, when you should make truce, when you should parly, when you should make alliance, when you should make league. How you should make warre, how you should make peace, how you should make truce, how you should parly, how you should make alliance, how you should make league. How much you should make warre, how much you should make peace, how much you should make truce, how much you should parly, how much you should make alliance, how much you should make league. And if you turn the third circle even as the second, you shall finde that the said 36 questions being joyned to the six common places of the said circle, will produce 216. Namely, *Whether you should make warre with your compatriots, whether you should make peace with your compatriots, whether you should make truce with your compatriots, &c.* These 216 questions are resolved by the common places of the fifth, sixth and ninth circles.

If you have concluded to make warre, the questions to be propounded about the *actions* thereof, are to be taken out of the first and fourth circles, which will produce 36 propositions (as was said of the first and

second

whether you ought to refuse. With whom you should advance, with whom you should abide, with whom you should retreat, with whom you should fight, with whom you should lodge, with whom you should refresh, Where you should advance, &c.

The affirmation of the 36 last propositions is taken from the common places of the fifth, sixth, seventh, eighth, and ninth circles. Now, that these common places may be sufficient to afford reasons for the confirmation of these propositions, the following example will declare, and will give instruction for the order which must be observed, for the resolving of other questions propounded.

The first question is, *Whether you should make warre?* whereupon you must consider of the *reason* which you have so to do; whether it be *honour*, as to conserve your own, to maintain another, to exile injustice, to punish evill doers. Whether it be *profit*, as to raise your state, to augment your dignities, to gather wealth, to advance your friends. Whether it be *obedience* due to the Soveraigne, or to those which himself or the laws have set over us. Whether it be *obligation*, being bound thereunto either by equitie, or oath, or consanguinitie, or alliance. Whether it be *facilitie*, as to resist the assaults of the enemie, to usurpe his dominions, and to bring him under subjection in short time, and with little charge.

Having considered of the *reason* you must come to the *occasion*, which may be either in respect of *men*, which are either plebeians or militarie. Concerning the plebeians (if it be in a free state, and not a monar-

chie) to know whether they will consent and approve of the *action*, furnish men for the warre, deliver places for securitie, money to bear all the charges, and submit themselves to your judgement and discretion. Concerning the militarie men, whether they be willing to obey you, deliver you hostages, and put their fortunes, goods, and honours into your hands.

Now for the regard of *means*, as whether you have good store of money beforehand, or means to get it, by favour of friends, or to take it from your enemies, making warre at his charge, or having good store of auxiliaries from your allies, and means to pay them.

And in respect of *munitions*, whether you have abundance of victuall, as well for the provision of cities, as for the feeding of the armies, magazines well stored, great store of draught horses for the ready drawing of the train where it shall be needfull.

Or in regard of the *time*, whether it be when there is a dissention, fomenting one of the parties; in the minoritie of the Soveraigne, insinuating with his officers; in the midst of a profound peace, when there is no doubt of combinations, when a great mortalitie rageth amongst the enemies, and famine weakneth them; or when you conceive that the fear of warre will constrain them to give you more then you could get by it.

Or in respect of the *works*, whether you possesse strong cities, assured havens, and well fortified cittadels.

Or in regard of the *countrey*, whether you possesse the straits, the key sides, bridges, that so you may facilitate the entrance of your releefs, and easily to joyn your self to them, and by that means be master of the field, possessing so much of the countrey as you are

able

able to guard, and abandoning that which you could not be able to maintain, and whereof the coſt would ſurpaſſe the profit.

Concerning the *faſhion* of proceeding, it is taken from the *order* which you muſt obſerve before you execute any thing; as whether you ought to begin, or to give occaſion to the enemie to do it, in what place you ſhould give the firſt aſſault, in what ſtaple towns; and if it ſhould be ſo, how you ſhall march thither, with what quantitie of Infanterie, Cavallrie, and Artillerie you ſhould execute the enterpriſe; whether you be able to do it alone, or whether you muſt call your friends to help you; who (amongſt all) ſhall begin, who ſhall do the exploit, who ſhall conſerve that which ſhall be gotten.

Then what commoditie you ſhall reap thereby, whether you ſhall be in peace afterwards, or the nobilitie be better pleaſed, the church more flouriſhing, juſtice better adminiſtred, the people leſſe burthened, the King better ſerved, the ſtate better ſecured; what *commoditie* will facilitate the enterpriſe, will it be vicinitie, will it be the weakneſſe of the enemie, of his countrey, of his people, of his towns, of his bad councell, of his diſorder in his actions, or that you have no want of any thing.

What *Aſſurance* have you that the execution will ſucceed according to your deſire; and if that be wanting, how ſhall you aſſure your affairs; will you hazard all your fortune at a time, will you play at double or quit, or will not that which you undertake be able to hurt you but in part, or but little, or nothing at all, neither to your ſelf nor your friends.

Shall you *ſurpriſe* your enemie at unawares, keeping ill guard in his cities, or being weakly followed in the

field, at a time when he is solacing himself either with coursing or hunting, and without being able to be advertised of your designe, untill he be fallen into your hands?

Can you by your *diligence* prevent his knowledge, and so your own obstacles and his remedies?

Have you *foreseen* whatsoever may befall you, as well in your designe, in the action, and after the execution thereof, to prevent the mischief, and to advantage your self by the good thereof? will your confederates be faithfull to you? If false, shall they be able to hinder the enterprise in the whole or onely in part, or in your very person, by seizing thereon and delivering you into the enemies hands? and if they can, by what device shall you be able to escape them? If the things aboveſaid be so advantageous as you ought to conclude for warre, you must then come to the other question, *with whom you ought to make it*, whether with your *compatriots*, or with your *allies*, or *confederates*, &c. and to see the *reason*, the *occasion*, and *fashion* by which you should proceed, passing through all these common places.

That done, you must handle the questions which concern the *action*, which are, *whether or no*, *with whom*, *where*, *when*, *how*, and *how much* you shall do that which you have concluded (as hath been shewed in the first question:) as if a generall had caused his armie to be mustered, he shall deliberate wherein to imploy it, as *whether* he should cause it to *advance*, or *abide*, or *fight*, &c. Suppose *if he ought to cause his armie to march*, he ought to do it when it is to fight with the enemie, to hinder him from passing a champain, a river, a strait, to cut off his releef; or for his own effecting of these things, or to besiege some place,

to

to releeve it, to cut off a convoy, or to conserve, or pillage the open country.

You must *advance*, when your *abiding* or *retreat* would be dishonourable, when the hope of the *profit* is great, when superiours *command* it, when alliance *oblige* you to it, when *necessitie* constrains you thereunto, and when the thing is so *facile* as nothing can oppose you.

That which will *occasion* your moving, will be the advantage of *men*, be it on foot or horseback; of *means*, as money, waggons, artillerie; of *munitions* both for the mouth and for warre; the commodiousnesse of *time*, fair, cold, or rain. Of the *works*, as forts, trenches, redouts. Of the *country*, as large, spacious, and even, to range your battaillons and squadrons; or close and mountainous, to passe undiscovered and sheltred. The *instruments* which may facilitate the designe, are *waggons* to carrie the munitions; *ladders* to serve for surprises; *bridges* to passe over moats and rivers, *pickaxes* and *shovels* to make the trenches and other works, and *boats* to passe rivers. The *accidents* which you ought to foresee, are the *noise* which hindreth the souldiers from hearing the orders, and affrighteth them; the *sunne*, which may dazle them; the *water* of pools, moors or rain, which may discommode you; the *cold*, which may put your souldiers out of case to fight; the *dust* raised in the field by the footing; and the *smoak* of firings, which hinders you from seeing the battaillons, and the actions of the enemie. After that, you must consider the *fashion* of your march, what *order* your Infanterie shall observe, what your Cavallrie, and what your Artillerie; what commoditie this marching will afford you, whether it will advantage you, and whether you shall be the better for

it

it in the whole [illegible]
be, whether it is your [illegible]
ſtrength of your ſide, or of the [illegible]
friends; whether you muſt march upon *[illegible]*
night, to pillage; with ſuch *diligence* as you may be
farre before you be diſcovered; *foreſeeing* for all
things neceſſarie, as to be able to make reſiſtance, being
charged; to arrive timely, before the danger; to be
ſtrongly and commodiouſly encamped, in ſuch ſort as
you may not fear neither the ſurpriſes of the enemie,
nor the violence of his aſſaults.

Theſe common places may be applied as well to divers other actions as to that of warre, provided that you know which to chooſe, and how many.

FINIS.

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